NATIONAL CAR BUILDER

VOLUME XVI.
NUMBER 7.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

$1.00 PER ANNUM
SINGLE NUMBERS TEN CENTS.

NEW YORK:
Morse Building, 140 Nassau St.

JULY, 1885.

Entered at the Post Office at New York N. Y., as Mail Matter of the Second Class.

CHICAGO:
144 N. Clark Street.

Fine Coach and Railway Varnishes.

CLARENCE BROOKS & CO.
MANUFACTURERS OF
VARNISHES,
Cor. West and West 12th Streets,
NEW YORK.

SEND FOR PRICE LIST.

CAR SEATS.
GEORGE BUNTIN & CO.,
SOLE MANUFACTURERS OF
Buntin's Patent Car Seats,
AND NICKEL PLATED ARM CAPS, IN USE ON RAILROADS GENERALLY.
No. 1,042 Ridge Ave., Philadelphia.

VOSE
Graduated Springs
FOR
CITY, FREIGHT & PASSENGER
CARS.
RICHARD VOSE,
13 Barclay St., NEW YORK.

Important to Railroad Managers and Master Mechanics.

SIBLEY'S PERFECTION VALVE OIL.

More perfect lubrication insured, and entire freedom guaranteed from corrosion of cylinders and destruction of steam joints by fatty acids.
In exclusive use on 50 railroads.
References and prices furnished upon application.

☞ Make exclusive specialty of the Manufacture of Valve and Signal Oils for Railroad use.

SIGNAL OIL WORKS,
FRANKLIN, PA.
J. C. SIBLEY, President.

GEO. WESTINGHOUSE, Jr., President. T. W. WELSH, Superintendent. JOHN CALDWELL, Treasurer. W. W. CARD, Secretary. H. H. WESTINGHOUSE, General Agent.

THE WESTINGHOUSE AIR-BRAKE COMPANY,
Pittsburgh, Pa., U. S. A.,
MANUFACTURERS OF THE
WESTINGHOUSE AUTOMATIC BRAKE,
WESTINGHOUSE LOCOMOTIVE DRIVER BRAKE,
VACUUM BRAKES (Westinghouse & Smith Patents),
WESTINGHOUSE FREIGHT BRAKE.

The Automatic Freight Brake is essentially the same apparatus as the Automatic Brake for passenger cars, except that the various parts are one piece of mechanism, and is sold at a very low price. The saving in accidents, flat wheels, brakemen's wages and the increased speed possible with perfect safety, will repay the cost of its application within a very short time.

The "AUTOMATIC" has proved itself to be the most efficient train and safety brake known. Its application is instantaneous; it can be operated from any car in the train, if desired, and should the train separate, or a hose or pipe fail, it applies automatically. A GUARANTEE is given customers against LOSS from PATENT SUITS on the apparatus sold them.

FULL INFORMATION FURNISHED ON APPLICATION.

GEORGE WESTINGHOUSE, JR., President. ROBERT PITCAIRN, Treasurer. ASAPH T. ROWAND, Secretary.
C. H. JACKSON, Vice-Pres. & General Manager. HENRY SNYDER, General Agent.

THE UNION SWITCH AND SIGNAL CO.,
SOLE MANUFACTURERS OF APPROVED
RAILWAY INTERLOCKING, SWITCHING & SIGNALING APPLIANCES,
With Automatic Electric Locking, without which no interlocking is safe.
FROGS, CROSSINGS, SWITCHES AND SWITCH STANDS.
Catalogues, Plans and Estimates, with reference to about 500 apparatus in practical operation, will be furnished upon application.
OFFICE AND WORKS, corner Garrison Alley and Duquesne Way,
PITTSBURGH, PA., U. S. A.

THRESHER'S RAILWAY VARNISHES
Manufactured by
Thresher & Co.
Dayton, O.
Unsurpassed in Quality.
Established 1858.

BOUND VOLUMES OF THE
National Car-Builder
For 1880, 1881, 1882, 1883 and 1884.
Price, $3 Each.

Warranted Superior to any Steel in the Market, either English or American, for every purpose. Send for Circular and Price List.

CHROME CAST STEEL

CHROME
STEEL WORKS,
Kent Av. & Keap St., Brooklyn, E.D., N.Y.

CLIFF & RIGHTER CO.
(Limited.)
THEO. IRWIN, Pres. GEO. B. SLOAN, Treas. EDMUND K. RIGHTER, Sec. EDWARD CLIFF, Sup't.
MANUFACTURERS OF
RAILWAY CAR SPRINGS.
OSWEGO, N. Y.
REPRESENTED BY
LEHMAN B. HOIT.

JOHN R. GRAHAM,
IMPORTER AND DEALER IN
ROSEWOOD & MAHOGANY
AND ALL OTHER
FOREIGN AND DOMESTIC
CABINET WOODS,
SUITABLE FOR CAR WORK.
Cor. 11th Ave. and 30th St.
NEW YORK.

FOR CARS.
Cold drafts around car windows and doors also Dust and Cinders entirely excluded, and Rattling sashes stopped by Browne's Metallic and Rubber Window and Door Bands, now in use 20 years on Drawing Room, Sleeping, and Passenger Cars in U. S. and Europe, Pullman, Wagner, Woodruff, and all R. R. Co.s and Car Builders. Samples mailed free.
Pat. Metallic Weather Strip Co.
74 West 23rd St. N.Y.

D. P. SLATTERY, President.
JOHN B. GRAY, V. P. & Gen. Mg'r.
E. B. LEIGH, Sec'y and Treas
S. W. McMUNN, Genl. Agent.
GEO. H. POOR, Mech. Supt.
ALBERT BLAIR, Attorney.

American BRAKE Company,
MANUFACTURERS OF
AUTOMATIC FREIGHT CAR BRAKES AND STEAM DRIVER AND TENDER BRAKES.
ST. LOUIS, MO.
We offer to Railway Companies the only Exclusively Independent Self-Acting Freight Train Brake which has yet been adopted by any Railway in the World. Our Steam Driver and Tender Brake is acknowledged to be the Cheapest, Simplest and BEST Power Brake now in use. Is now used by over 100 different Railroads.

CAR-BUILDERS' DICTIONARY.

COMPILED UNDER THE DIRECTION OF THE MASTER CAR-BUILDERS' ASSOCIATION.

REVISED EDITION PUBLISHED DECEMBER, 1884.

This book is twice as large as the original edition, and contains 2,188 engravings, including exact engravings of American Cars of every description, and of the different kinds of Trucks, Wheels, Brakes, Couplings, Seats, Lamps, Heaters, and all Car Furnishings in general use, in the minutest detail. All the detail drawings are made to scale, and each engraving is briefly described under the definition of its name. All terms in general use in car-building are defined. This is the most elegant, as well as the most valuable, book on American cars ever published, and forms a volume in character and appearance such as usually sold for $5.00. No one connected in any capacity with car-building can afford to be without a copy for study and reference.

WE OFFER

A Copy of the **CAR-BUILDERS' DICTIONARY** (Price $3.00) and Subscription to the **NATIONAL CAR-BUILDER** for one year (Price $1.00) for

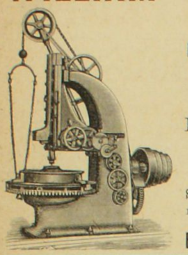
$3.00.

ADDRESS
THE NATIONAL CAR-BUILDER,
MORSE BUILDING, NEW YORK.

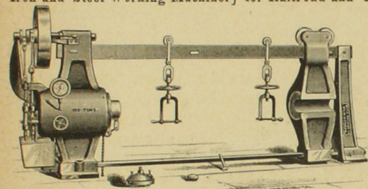
ESTABLISHED 1832 Stimson & Co. Mfrs. of Coach and Car Varnishes. 149 Milk St. Boston Mass.

Ames Car Coupling Company,
F. W. PARSONS, Manager,
1430 South Penn Square, Philadelphia.

WILLIAM SELLERS & CO.,
PHILADELPHIA.
Iron and Steel Working Machine Tools, for Railways, Machine Shops, Rolling Mills, etc.
PIVOT BRIDGES-SHAFTING.
THE 1876 INJECTOR BOILER-FEEDER.
SIMPLE, RELIABLE AND EFFECTIVE.
Started, Regulated and Stopped by One Motion of a Lever.
Pneumatic Fire for Extinguisher, use in Passenger and Freight Cars Buildings, etc.
Branch Office: 79 Liberty Street, New York.



BETTS MACHINE CO., Wilmington, Del.,
MAKERS OF
Iron and Steel Working Machinery for Railroad and Car Shop Equipment.
Drills,
Lathes,
Planers,
Slotters,
Axle Lathes,
Wheel Presses,
CAR-WHEEL BORERS,
Driving Wheel LATHES,
Quartering Machines.
NEW ENGLAND AGENTS: Hill, Clarke & Co., Boston, Mass.



THE PRATT & WHITNEY CO.,
HARTFORD, CONN.,
MANUFACTURERS OF
Machine Tools for Railway and General Machine Shops, Forging and Finishing Machinery, Corrugating Machines for Grooving Chilled Grinding Rolls, Lathes, Planers, Drilling Machines, Screw Machines, Milling Machines, Turret-Head Chucking, Bolt Cutting, Nut Tapping and Cutting off Machines.

Plants complete for Gun and Sewing Machine Manufacture, and **Special Machinery for Every Purpose.**

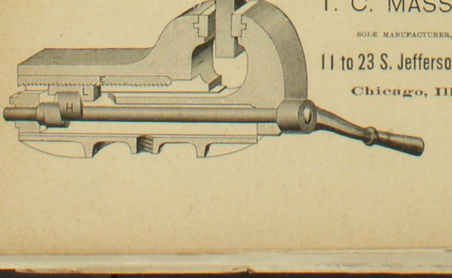
Master Car-Builders' U. S. Standard Thread Gauges, U. S. Standard Taps and Dies, both Hand and Machine, M. C. B. Standard Bar Iron Limit Gauges. Standard Cylindrical Size Gauges, Drop Forged Steel Caliper Gauges. Standard Hand, Shell and Chucking Reamers. Hardened and Ground Mandrels, and Every Appliance in Tools or Special Gauges necessary for Standard Interchangeable Work. Combination Lathe Chucks, Renshaw Ratchet Drills.

Corundum Wheels of every size, shape or grade, in stock, or made to order.

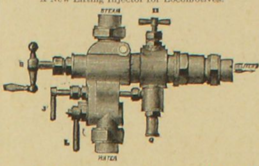
☞ Send for Illustrated Catalogue.

NOW IS THE TIME TO BUY
THE HANDSOMEST! CHEAPEST! BEST!
OUR CORRUGATED IRON ROOFING,
SIDING, CEILING, ARCHES, LATH, Etc.
The Cincinnati Corrugating Co.,
CINCINNATI, OHIO.
Send for Illustrated Catalogue and Bottom Price

Massey's E. & K. Patent Machinists' Vise.
NO LOST MOTION.
T. C. MASSEY,
SOLE MANUFACTURER,
11 to 23 S. Jefferson St.,
Chicago, Ill.

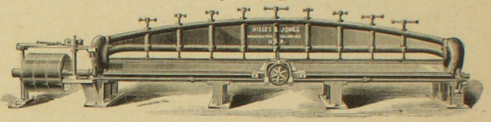


FRIEDMANN'S PATENT LOCOMOTIVE INJECTORS
THE "MONITOR,"
A New Lifting Injector for Locomotives.



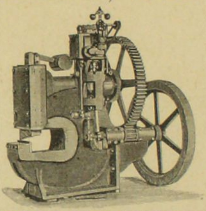
Send for Descriptive Circular.
Lifting and Non-Lifting, with all Latest Improvements.
EJECTORS FOR WATER STATIONS
Construction Trains Etc.
OILERS, LUBRICATORS, Etc.
New Patent Boiler Washer and Fire Extinguisher.
NATHAN MFG. CO.,
92 and 94 Liberty Street, New York.

BOILER PLATE PLANER.
Will Plane any Length of Plate.

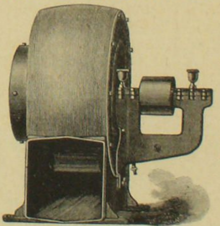


Tools cut both ways and have independent adjustment. Table acts as a gauge for setting the Plate. Driven by a Steel Screw, which is supported its entire length so that it cannot be bent or sprung.
HILLES & JONES, Wilmington, Del.

BEMENT, MILES & CO., Philadelphia,
MANUFACTURERS OF
METAL WORKING
MACHINE TOOLS
Of all descriptions, and a great number of sizes, including
Lathes, Planers, Drills, Shapers, Slotters, Milling and Boring Machines,
Steam Hammers, Steam and Hydraulic Riveters, Cranes, Punches and Shears, Bending Rolls, Plate Planers, etc., etc.



BUFFALO SHAVING & VENTILATING EXHAUST FANS
IN ALL THEIR VARIETY,
For Every Possible Duty.
WARRANTED SUPERIOR TO ANY OTHER MAKE
In Economy, Durability and Effectiveness.
BUFFALO FORGE CO.,
BUFFALO, N. Y.



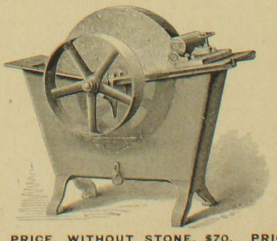
BROWN & SHARPE MFG. CO., PROVIDENCE, R. I.
IMPROVED GRINDSTONE TROUGH.

This cut represents a Grindstone Trough combining a number of very desirable qualities. In addition to the ordinary arrangement of trough, spindle and pulley, it is provided with self-oiling boxes and an adjustable truing device which can be instantly applied to the face of the stone, working automatically and without dust, keeping the face of stone always in good shape without interfering with its constant use.

Directions.—The stone should revolve so as to have the device upon the face which moves upward. The main stand or bottom piece of the device is securely clamped upon the trough close to the face of the stone, then by turning the hand wheel the threaded roll is brought into contact with the face of the stone and allowed to remain as long as is requisite to produce the desired result. The water is to be left in the trough as usual. When by long use the thread on the hardened roll becomes worn, it can be re-cut, which operation may be repeatedly performed.

Weight, 600 pounds; with 40-inch stone, 1,000 pounds.

PRICE, WITHOUT STONE, $70. PRICE, STONE INCLUDED, $85.



THE E. D. ALBRO COMPANY,

MAHOGANY.

MANUFACTURERS OF

VENEERS, CAR-BUILDERS' MATERIAL

FROM DOMESTIC AND FOREIGN WOODS.

685--711 West 6th St., **CINCINNATI, O.**

Estimates and Price Lists Furnished.

THE A. FRENCH SPRING CO., Limited,

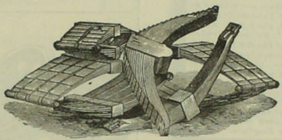
PITTSBURGH, PA.,

MANUFACTURERS OF

EXTRA TEMPERED, ELLIPTIC AND SPIRAL SPRINGS OF ALL DESCRIPTION.

OFFICERS:

AARON FRENCH, Chairman.
JULIUS E. FRENCH, Vice-Chairman.
GEO. W. MORRIS, General Manager.
D. C. NOBLE, Secretary and Treasurer.
W. P. HANSELL, General Superintendent.



OFFICES AND WORKS:
20th and Liberty Streets,
21st and Liberty Streets,
25th and Smallman Streets,
PITTSBURGH, PA.

ALL SPRINGS MADE OF THE BEST QUALITY CRUCIBLE STEEL,
WITH PATENT HOT COMPRESSED BANDS FOR RAILROAD CARS AND LOCOMOTIVES.

UNITED STATES CENTENNIAL COMMISSION, OFFICIAL REPORT.—Diploma and Medal awarded for Good Design, Excellence of Workmanship and Material, Uniformity of Action and Durability.

HANSELL'S PATENT KEG-SHAPE STREET CAR SPRINGS.

NEW YORK:
88 Boreel Building,
H. J. GERIKEN, Agt.

BOSTON:
52 Mason Building,
JNO. KENT, Agt.

CHICAGO:
Rooms 13 and 14 Adams' Express Building,
183 Dearborn St.
JOS. M. ROGAN, Agt.

JOHN WILEY & SONS, 15 Astor Place, New York,

HAVE NOW READY

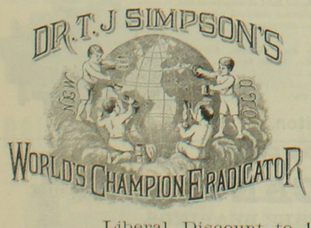
THE ARCHITECT'S AND BUILDER'S POCKET-BOOK, a thoroughly practical work, especially adapted to the needs of American Architects, Builders, Contractors and Draughtsmen. Treating of Mensuration, Geometry, Trigonometry, Rules, Tables, and Formulas relating to the Strength and Stability of Foundations, Walls, Buttresses, Piers, Arches, Posts, Ties, Beams, Girders, Trusses, Floors, Roofs, etc., etc., with Statistics and Tables relating to Carpentry, Masonry, Drainage, Painting and Glazing, Plumbing, Plastering, Roofing, Heating and Ventilation, Weights of Materials, Capacity and Dimensions of Churches, Theatres, Domes, Towers, Spires, etc., etc. By F. E. Kidder, C. E., Consulting Architect. Morocco, round corners; 600 pages; 408 engravings. Price, $3.50.

CROMWELL'S TREATISE ON TOOTHED GEARING. Containing complete instructions of Designing, Drawing and Constructing Spur Wheels, Bevel Wheels, Lantern Gear, Screw Gear, Worms, etc., and the proper formation of Tooth Profiles. For the use of Machinists, Pattern Makers, Draughtsmen, Designers, Scientific Schools, etc.; with many plates. 12mo, cloth. $2.

SINCLAIR'S LOCOMOTIVE ENGINE, RUNNING AND MANAGEMENT. A practical Treatise on the Locomotive Engine, with particulars, showing their performance in running different kinds of trains with dispatch and economy, and directions regarding the Care, Management and Repairs of Locomotives and all their connections. Illustrated by numerous engravings. Second edition. 12mo, cloth. $2.

THURSTON'S STATIONARY STEAM ENGINES. Especially adapted to Electric Lighting Purposes. Treating of the Development of Steam Engines, the Principles of Construction and Economy, with Description of Moderate-Speed and High-Speed Engines. 8vo, cloth. $1.50.

*** MAILED AND PREPAID ON THE RECEIPT OF THE PRICE.



Promptly removes Paint and Varnish from Wood and Metal Surfaces, leaving them in as perfect condition for re-painting and varnishing as before they were first painted or varnished.

Full lines of goods in 5 and 10 lb. packages, with all necessary instructions.

Liberal Discount to Dealers.

GEO. R. THURSBY & CO.,
71 MAIDEN LANE, NEW YORK.

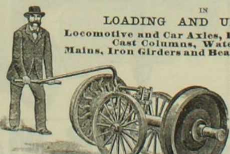
CORRESPONDENCE SOLICITED.

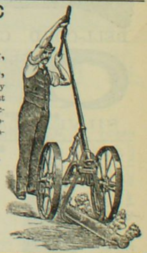
THIS TRUCK IS AUTOMATIC

IN

LOADING AND UNLOADING

Locomotive and Car Axles, Bar Iron, Shafting, Cast Columns, Water and Gas Mains, Iron Girders and Beams, Timber, Stone,



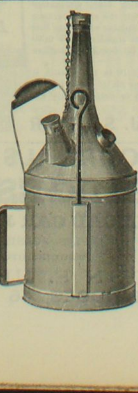


etc., and is universally conceded to be the most simple, ingenious, effective, durable and economical machine yet produced.

FOR ILLUSTRATED CATALOGUE

Address

JOHN TERHUNE, Manager,
Automatic Truck Works,
P. O. Box 19. MIDLAND PARK, N. J.



THE NOYES MFG. CO.,

MANUFACTURERS OF AND DEALERS IN

RAILROAD SUPPLIES.

Noyes' Patent Liquid and Condensed Cooler, for Cooling Railroad Car and Steamboat Journals.

The Ormsby Patent Car-Sash Balance and Lock

operates easily, does not rattle, holds the sash at any point.

47 India St., Boston, Mass.

P. NOYES, General Manager.

Best of references from prominent R. R.'s after using 15 years. Send for sample Condensed or Liquid Cooler. Satisfaction guaranteed, or no pay.

ROANOKE MACHINE WORKS,

ROANOKE, VIRGINIA,

BUILDERS OF

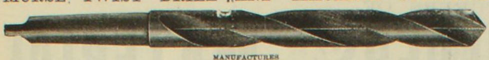
FREIGHT CARS (CAPACITY, 8 CARS PER DAY) AND FIRST-CLASS CAR WHEELS

Out of the Best Charcoal Iron.

Capacity, 50 Car Wheels per day.

ALSO BUILD LOCOMOTIVES OF ANY DESCRIPTION.

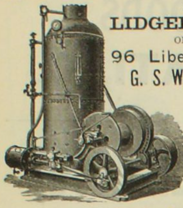
MORSE TWIST DRILL AND MACHINE COMPANY



MANUFACTURES

Patent Twist Drills, Machine Bits for Wood, Bit Stock Drills, Reamers, Standard Gauges, Milling Cutters and Special Tools, for use in Railroad, Car and Locomotive Shops. **NEW BEDFORD, Mass.**

IMPROVED HOISTING ENGINES,



MANUFACTURED BY THE

LIDGERWOOD MFG. CO.

OFFICE AND SALESROOMS,

96 Liberty Street, New York.

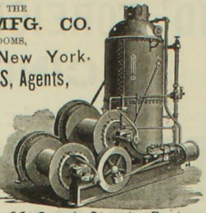
G. S. WORMER & SONS, Agents,

Chicago, St. Louis and Detroit.

Over 150 different sizes and styles for ALL PURPOSES.

Also

MINING ENGINES,

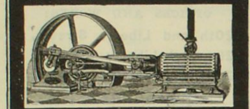


J. H. HOUGHTON, Eastern Agent, 66 Canal Street, Boston.

THE CUMMER ENGINE CO.

CLEVELAND OHIO

SEND FOR 150 PAGE ILLS CATALOGUE.



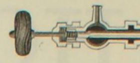
Awarded highest premiums at Cincinnati and Louisville Expositions of 1883, for "Best Automatic Engine." We will furnish anyone copies of the ORIGINAL ENTRIES of several engine builders who claim they were not competing with us. They all entered in the same class with us, and now by deceptive Circulars (one headed "Fact versus Falsehood,") attempt to mislead.

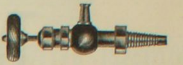
☞ *No premiums were offered for Condensing Engines.*

AUTOMATIC

THE

ATWOOD-SLATE SAFETY GAUGE VALVE.





Gives perfect control of the steam and water within the boiler to the engineer in charge, and affords afety from all harm resulting from the breaking of the valve. Simple in construction, having few points of wear; thoroughly positive in its action; can be packed at any time. An examination of this device is invited.

Send for Circulars.

Address GEORGE DWIGHT, Jr., Springfield, Mass.

$ $ $ $ SAVED $ $ $ $

1977 NINETEEN HUNDRED SEVENTY-SEVEN 1977 MACHINES

BOTH NEW AND SECOND-HAND

COMPRISING MACHINE AND BLACKSMITH TOOLS OF EVERY DESCRIPTION. WOOD-WORKING MACHINERY IN ALL ITS BRANCHES. PORTABLE ENGINES. UPRIGHT and HORIZONTAL STATIONARY ENGINES, 1 TO 300 HORSE POWER. LOCOMOTIVE FIRE BOX, HORIZONTAL, and UPRIGHT BOILERS, 1 TO 100 HORSE POWER. WATER WHEELS, COTTON AND WOOLEN MACHINERY, STEAM PUMPS, GRISTMILL MACHINERY, Etc., FULLY DESCRIBED, AND PRICES ANNEXED,

S.C.F.&CO.

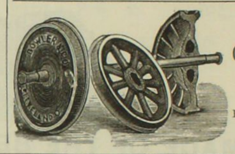
☞ Send stamp for same,] In our List No. 23. [stating what you want. ☜

We have the Largest Assortment of Machinery to be found in the hands of any firm in the country.

Works and Main Office, Manchester, N. H.

S. C. FORSAITH & CO.

Branch Office and Wareroom, 209 Center street, New York City.



CLEVELAND FOUNDRY.

Car Wheels of All Kinds and Sizes

WITH OR WITHOUT AXLES.

CHILLED-FACED RAILROAD FROGS.

Street Railroad Turnouts.

ROLLING MILL AND MACHINERY CASTINGS.

Nos. 9, 11 and 13 Winter St. Cleveland O.

BOWLER & CO.

VANDERBILT & HOPKINS,

RAILROAD TIES, CAR AND RAILROAD LUMBER, WHITE AND YELLOW PINE OAK, GUM AND CYPRESS.

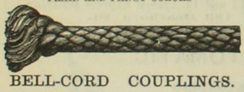
No. 120 Liberty St., N. Y.

Boards, Plank and Dimension Lumber Sawed to Order.

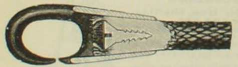
Creosoted Lumber. Ties and Piles to Order.

SOLID BRAIDED BELL CORD

PLAIN AND FANCY COLORS



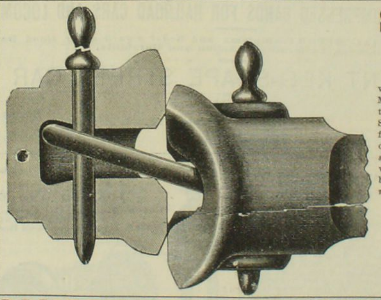
BELL-CORD COUPLINGS.



MANUFACTURED BY

SILVER LAKE CO.

HENRY W. WELLINGTON, Agent, BOSTON



SAFFORD'S SAFETY DRAW-BAR.

"VICTORY OVER MORE THAN 30 CONTESTANTS."

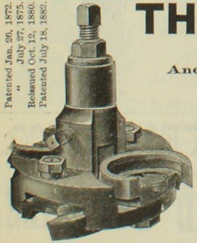
Victory over more than 30 Self-Couplers in the Master Car-Builder's Convention of June, 1876. Also indorsement for safety in coupling by the Yard Masters, in their Convention, June, 1877, and by 300 others who were unable to attend the Convention, and 300 railroad officials who are resident in 26 States, and who admitted superiority over any other yet produced. Try 30 free of royalty, and see for yourself! Pattern free, and no change in timbers or connections. Those made by Wilson, Walker & Co., Pittsburgh, Pa., *will save 200 per cent. in repairs*, and give double life service over *old styles of* wrought iron. About 43,000 in use by 146 railroads. The *saving in repairs* by using *my invention* is from 20 per cent. to 80 per cent. as per *report o many officers.*

J. B. SAFFORD,

EAGLE IRON WORKS

BUFFALO, N. Y.

Patented Jan. 26, 1872.
" July 27, 1875.
Reissued Oct. 12, 1880.
Patented July 18, 1882.



TONGUE HEAD.

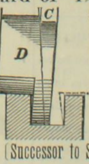
THE SHIMER MATCHER HEADS.

THE CHEAPEST! THE STRONGEST! THE MOST DURABLE!

And yet the Lightest and Easiest Running Matcher Heads in the World. Upward of 12,000 Sold.

The Bits are arranged in upper and lower series, and secured to a Head having seats alternately inclined for the purpose of giving the side clearance to their cutting points. This explains why these Bits hold their shape and turn out standard work until used up; the entire circle of Bit being tool cutting edge.

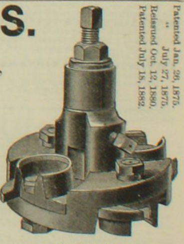
This diagram represents a Bit (*D*) in the position it occupies when making a cut: the Bit (*C*) which follows to complete the work is given in outline. This explains the division of cut and the free and easy working of the Tool. They finish hard cross-grained and knotty lumber neatly, (showing clean-cut edges and often *save their cost in one day's run.*



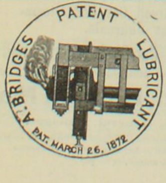
We also make **Ship Lap Heads, Jointer Heads, Dado Heads, Sash Heads, Door Heads, Cope Heads** and Heads for any special work where a perfectly uniform pattern is required. Send for Descriptive Circular.

SAMUEL J. SHIMER (Successor to Shimer & Co.), Milton, Penn.

Patented Jan. 26, 1875.
" July 27, 1875.
Reissued Oct. 12, 1880.
Patented July 18, 1882.



GROOVE HEAD.



HOT JOURNALS ENTIRELY PREVENTED.

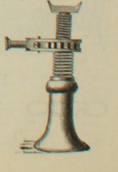
BRIDGES' LUBRICANT

FOR RAILROAD CAR JOURNALS AND OTHER BEARINGS.

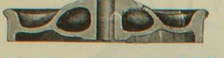
SAMPLES FURNISHED GRATIS. SEND FOR CIRCULAR.

Manufacture Ball's Telescopic Screw Jack.

JOHN S. URQUHART, Successor to
ALBERT BRIDGES, 46 CORTLANDT STREET, NEW YORK.



LEWIS H. TAYLOR, Pres.
S. P. RABER, Sup't. and Treas.
L. S. VANDERBEEK, Sec. and Asst. Treas.
New York Office, - - 91 Liberty st.



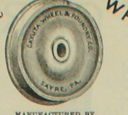
TAYLOR IRON WORKS,

High Bridge, N. J.,

MANUFACTURERS OF
Chilled Iron Car-Wheels, Steel-Tired Wheels, Car and Locomotive Axles and Draw Hooks

Best Chilled Iron

CAR WHEELS.


CAYUTA WHEEL & FOUNDRY CO.
SAYRE, PA.

MANUFACTURED BY
CAYUTA WHEEL AND FOUNDRY CO.
SAYRE, PA.
HOWARD ELMER, President. M. C. CHAPMAN, Supt.

PARDEE CAR WORKS,

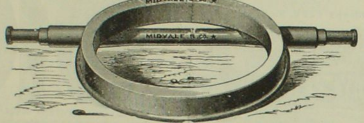
WATSONTOWN, PA.
PARDEE, SNYDER & CO. (Limited), Proprietors.
C. W. LEAVITT, Agent, 161 Broadway, Room 2, N. Y.

SOUTHERN CAR WORKS,

MANUFACTURERS OF
RAILROAD CARS,
Box, Flat, Gondola, Ore, Mining, Etc.
KNOXVILLE, TENN.

THE MIDVALE STEEL CO.

A. G. TOMPKINS & CO., Boston.
CONGDEN, CARPENTER & CO., Providence, R. I.
H. A. ROGERS, New York.
W. H. WALLACE & CO., New York.
MANNING, MAXWELL & MOORE, N. Y.
CRERAR ADAMS & CO., Chicago.



POST & CO., Cincinnati.
W. & A. C. SEMPLE, Louisville.
E. H. LINLEY, St. Louis.
GEO. A. SMITH, Richmond.
T. GUILFORD SMITH, Buffalo.

Works and Main Office: Nicetown, Philadelphia, Pa.
Branch Office, 333 Walnut St., Philadelphia, Pa.
Warehouse: 12 North Fifth street, Philadelphia, Pa.

TIRES AND AXLES OF EVERY DESCRIPTION.
HEAVY CASTING AND FORGINGS.

The STANDARD STEEL WORKS.

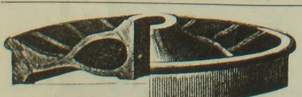
Manufacturers of
Locomotive and Car Wheel
TIRES.
Office 220 South Fourth St.
PHILADELPHIA, PA.

LEHIGH CAR MANUFACTURING COMPANY

MANUFACTURERS OF
Box, Gondola, Flat. Coal, Ore Drift or Mine Cars. Capacitv, 16 Cars Per Day.
Stemton, Northamnton Co., Pa. New York Office, 91 Liberty St., Room 4.
H. H. FISHER, President. G. H. STEM, Supt. B. E. LEHMAN, Vice-President.

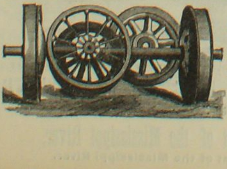
CARLISLE MANUFACTURING CO.,

MANUFACTURERS OF
FREIGHT CARS, BOX, STOCK, GONDOLA, IRON HOPPER, COAL and MINING CARS,
ENGINES and MILL MACHINERY,
CARLISLE, PA.



WASON MANUFACTURING CO.

SPRINGFIELD, MASS
BUILDERS OF
RAILWAY CARS OF ALL DESCRIPTIONS,
CAR WHEELS AND RAILWAY CASTINGS.
H. S. HYDE, Treasurer. G. C. FISK, President.



MOWRY CAR WHEEL WORKS,

CINCINNATI, O.

Manufacturers of CAR WHEELS of all descriptions, Wheels and Axles, Chilled Tires; Engines, Car and Bridge Castings, of any pattern, furnished to order at short notice. Wheels of all sizes constantly on hand.

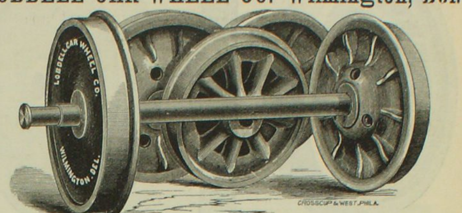
WORKS: Eastern Ave. and Lewis St.
OFFICE: 27½ W. Third St. Cincinnati O.

ESTABLISHED 1847.

A. WHITNEY & SONS' CAR WHEEL WORKS,

PHILADELPHIA, PA.

LOBDELL CAR WHEEL CO. Wilmington, Del.


LOBDELL CAR WHEEL CO.
WILMINGTON, DEL.
CROSSCUP & WEST, PHILA.

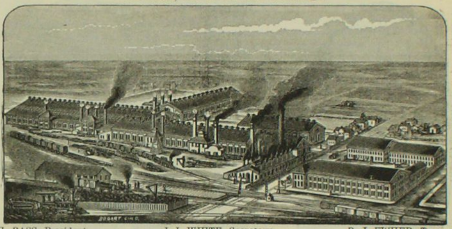
Single and Double Plate and Hollow Spoke Wheels for Steam Roads. Also, Solid and Open Plate Wheels for Street Roads.

Geo. G. Lobdell, President. Geo. G. Lobdell, Jr., Secretary. Wm. W. Lobdell, Vice-President. P. N. Brennan, Treasurer.

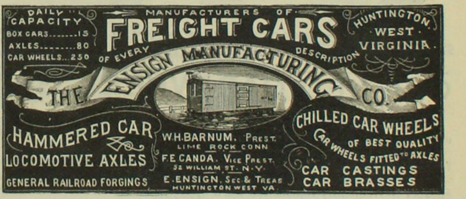
ESTABLISHED 1853 INCORPORATED 1873

BASS FOUNDRY AND MACHINE WORKS.

MANUFACTURERS OF
Steam Engines, Boilers, Heavy Machinery, Car Wheels and Railroad Castings, Car Axles and Forgings.



J. H. BASS, President. J. I. WHITE, Secretary. R. J. FISHER, Treasurer
FORT WAYNE, IND.



DAILY CAPACITY
BOX CARS........15
AXLES........80
CAR WHEELS...250

MANUFACTURERS OF
FREIGHT CARS
OF EVERY DESCRIPTION

HUNTINGTON, WEST VIRGINIA.

THE ENSIGN MANUFACTURING CO.

HAMMERED CAR & LOCOMOTIVE AXLES
GENERAL RAILROAD FORGINGS

W. H. BARNUM. Prest.
LIME ROCK CONN
F. E. CANDA. Vice Prest.
32 WILLIAM ST. N. Y.
E. ENSIGN, Sec & Treas
HUNTINGTON WEST VA.

CHILLED CAR WHEELS OF BEST QUALITY
CAR WHEELS FITTED TO AXLES
CAR CASTINGS
CAR BRASSES

THE HARLAN & HOLLINGSWORTH CO.,

CAR BUILDERS,

WILMINGTON, DEL.

Established in - - - - - 1836.

STEEL CASTINGS

FROM 1-4 TO 15,000 lbs. WEIGHT.

True to pattern, sound and solid, of unequaled strength, toughness and durability. An invaluable substitute for forgings or cast-iron requiring three-fold strength. Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for locomotives, etc. 40,000 Crank Shafts and 30,000 Gear Wheels of this steel now running prove its superiority over other steel castings. CRANK SHAFTS, CROSS-HEADS and GEARING specialties. Circulars and Price Lists free.

CHESTER STEEL CASTINGS CO.,
Works: CHESTER, Pa. 407 Library St., PHILADELPHIA.
C. HUBBARD, Agent, 46 Cliff Street, New York.

KRUPP COMPOUND.

THE STANDARD COOLER.

This compound as a cooler and lubricator for **Hot Journals** is unsurpassed.

Is best applied as a dope by mixing well with waste saturated with oil, and packing close to the journal.

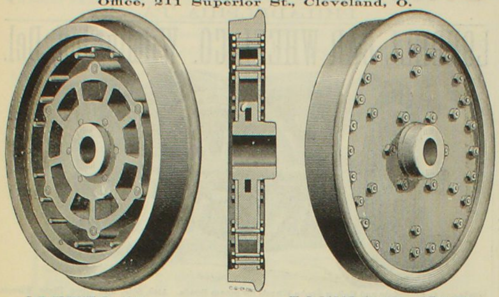
E. A. SMITH & CO.,
P O. Box 1,145. Pittsburgh, Pa.

PAIGE CAR WHEEL CO.,

MANUFACTURERS OF

PAIGE'S PATENT WROUGHT METAL WHEELS.

Office, 211 Superior St., Cleveland, O.



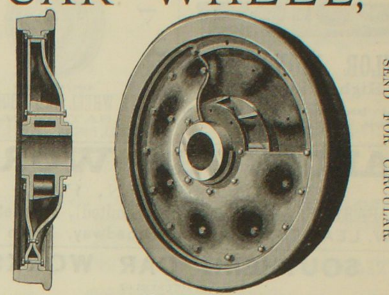
J. E. FRENCH, President. W. S. DODGE, Secretary and Treasurer.

Adapted for Sleeping and Drawing Room Cars, Locomotive and Tender Trucks. Steel Tires, four inches thick, with ½ inch Plates, securely bolted, making it a perfectly Safe, Durable and Noiseless Wheel.

THE STEEL TIRED SPRING PLATE CAR WHEEL,

IS LIGHT, STRONG AND CHEAP.

HAS NO RIGID CONNECTION BETWEEN TIRE AND AXLE.



SEND FOR CIRCULAR.

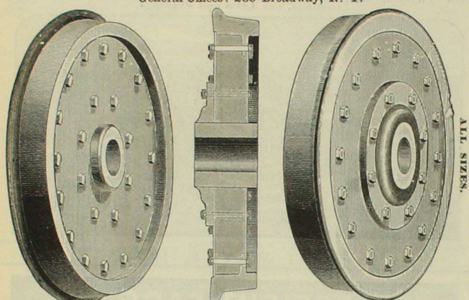
—MADE BY—

The Dickson Manufacturing Co.,

SCRANTON, PA.

ALLEN PAPER CAR WHEEL COMPANY.

General Offices: 239 Broadway, N. Y.



MANUFACTURERS OF ALLEN'S PATENT

PAPER CAR WHEEL.

ALL SIZES.

Especially adapted for Sleeping and Drawing-Room Cars, Locomotive and Tender Trucks. Steel Tire with Annular Web—Strongest, Most Durable, and Most Economical Wheel in use. Works at Hudson, N. Y., and at Pullman (near Chicago), Ill.

A. G. DARWIN, President. J. C. BEACH, Treasurer. C. H. ANTES, Secretary.

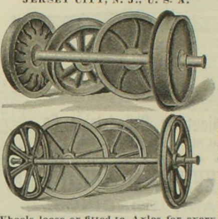
THE JERSEY CITY WHEEL FOUNDRY AND MACHINE WORKS,

MANUFACTURERS OF

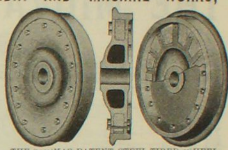
CAR WHEELS,

P. O. Box 129,

JERSEY CITY, N. J., U. S. A.



Wheels loose or fitted to Axles for every variety of Railroad Service.



THE THOMAS PATENT STEEL-TIRED WHEEL.

The above engraving represents a new Steel-Tired Car Wheel having practically an indestructible non-metallic bearing for the tire, of sufficient depth to intercept and destroy the vibrations common to ordinary chilled iron car wheels, and steel-tired wheels in which the tire rests directly upon a metallic centre, thus producing a noiseless wheel and one securing increased life for the tire and axle.

This is accomplished by casting a centre having a series of pockets or recesses on its circumference, **opening outward,** formed by the back plate of the casting extending to the top of the pocket, and the front plate to about half the height of the pocket, and separated from each other by radial metal walls. Into these pockets are forced from the periphery of the casting wedge shape blocks of wood, so treated that there is no possibility of shrinkage or deterioration. The wooden blocks before insertion are of such size that the pressure necessary to seat them secures their retention in the pockets when the pressure is removed, and when turned off to receive the tire they extend slightly beyond the radial walls, the tire thus bearing only on wood. To secure the tire to the centre, bolts pass through the internal flange and the radial walls, and, having a bearing in metal their entire length, held more firmly than when allowed to pass in part through the cushioning material.

Attention is called to the wheel as one of few parts, to the facility with which it may be refitted with new tire, and that the life of the wooden bearing is measured by the number of times the casting will admit of refitting to axle.

The wheel is manufactured by The Jersey City Wheel Foundry and Machine Works

For further information address THEODORE THOMAS, P. O. Box 129, Jersey City, N. J.

CHILLED CAR WHEEL GRINDING CO., CARSON, NEVADA.

Patented in United States and Canada.

H. M. YERINGTON, President. A. C. ELLIS, Vice-President. G. F. FORD, Secretary and Treasurer.

The CHILLED CAR WHEEL GRINDING MACHINE, which we now introduce, is no hasty device. It is the result of four and one-half years experience, and during that time has received a most thorough test, with satisfactory results.

Railroad officials, upon reflection, will admit it is more essential to have a machine to true up Chilled Car Wheels than a Tire Lathe for turning locomotive tires, for this reason: four or more driving wheel tires are required for one engine; a greater number of Car Wheels compose a train; hence the necessity of this invention.

The great hardness of the chilled tread has hitherto rendered the operation of turning them impracticable, owing to the great expense, which made it cheaper to frequently replace the worn wheels with new ones. To obviate these objections and reduce the cost of this process, we furnish a machine capable of making a perfect wheel at small expense.

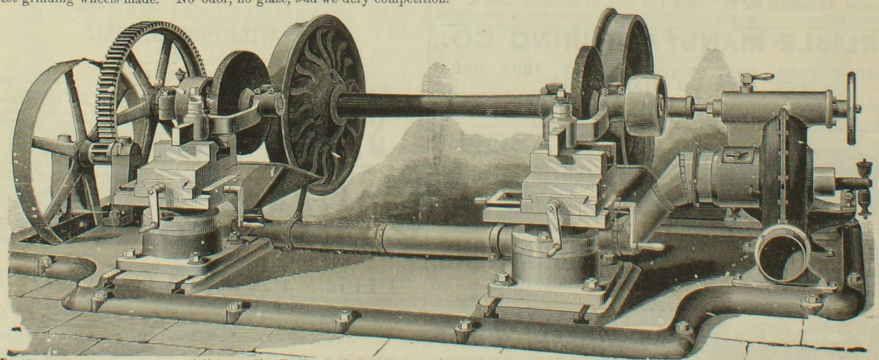
Wheels with flat places, and otherwise badly worn, that are ordinarily condemned and used for scrap iron, can be ground and fitted so as to double their original mileage. This alone makes our machine the greatest money saver ever introduced to railroads.

A sound Chilled Car Wheel trued by our method cannot be excelled by a paper or any other description of Car Wheel with steel tire.

Any person having a slight acquaintance with tools may, after five hours' instruction, become thoroughly competent to operate our machine.

Allowing all new wheels to be 3-32 inch oval, if properly fitted to axles, our machine *will* true up one pair an hour.

We manufacture expressly for use with our machine, Abrading Wheels, which, as the result of a series of experiments and long experience, we guarantee to be the best grinding wheels made. No odor, no glaze, and we defy competition.



Central Pacific Railroad,
Chicago & Northwestern Railway,
Chicago, Rock Island & Pacific Railway,
Virginia & Truckee Railroad,
Pennsylvania Railroad,
Denver & Rio Grande Railway,
Chicago, Milwaukee & St. Paul Railroad.
Canadian Pacific Railroad (Yale B. C.),
Chicago City R. R., Cable Road,
New York & New England Railroad,
Union Pac. Ry. (Denver & S. Park Div.),
South Pacific Coast Railroad,
Nevada County Narrow Gauge Railroad,
Chicago City Railway (South Division),
New York, Ontario & Western Railway,
Utah Cent. Railway,
Lehigh Valley Railroad,
Pullman Palace Car Company,
Allegheny Valley Railroad,
Chicago City Railway (West Division),
Carson & Colorado Railroad,
Lake Tahoe Narrow Gauge Railroad,
J. Harris & Co., St. Johns, N. B.
A., T. & S. Fe Railway,
Baltimore & Ohio Railroad,
New York, Lake Erie & Western,
New Brunswick Wheel Foundry Johns, N. B.
New York Central R. R., Harlem Div.
New York, New Haven & Hartford R. R
Michigan Central R. R.

We are prepared to sell machines outright, or to furnish them on royalty for each pair of wheels trued.

THE ALLENTOWN ROLLING MILLS, Allentown, Pa., Manufacturers and Financial Agents East of the Mississippi River.

NORTH STAR IRON WORKS CO., Minneapolis, Minn., Manufacturers and Financial Agents West of the Mississippi River.

THE BALTIMORE CAR WHEEL COMPANY,

MANUFACTURERS OF

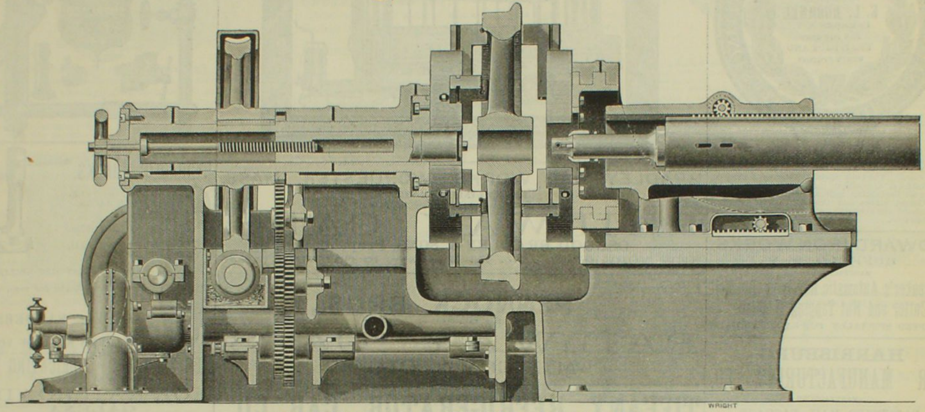
CHILLED WHEELS OF ALL PATTERNS AND SIZES, FOR EVERY SERVICE, AND WITH OR WITHOUT AXLES.

CAPACITY, 400 WHEELS PER DAY.

W. S. G. BAKER, *President and Treasurer.*
J. PAUL BAKER, *Secretary.*

OFFICE AND WORKS Fulton Junction, Baltimore, Md.

Combination Car Wheel Boring, Grinding, Truing and Turning Machine.



RAILWAY CAR WHEEL ECONOMY.

The long-felt want of a machine having greater capacity and accuracy for operating upon every construction, "including new and worn wheels withdrawn from service," is herewith represented, and will be placed for parties ordering the same upon a guarantee in writing. After a test, should it fail to have greater capacity and accuracy than *any* other tool, we agree to *remove it free of charge.*

It will bore the axle seat, turn the tread and flange of any steel or steel-tired wheel simultaneously.

It will centre any steel or steel-tired wheel by its already bored axle seat, turn the tread and flange in less time than any tool in existence.

It will *bore* and *true* a chilled iron wheel in less time, removing less chill therefrom, than any tool or system of tools for such purpose.

It is built first-class, well proportioned for its work and occupying a floor space of 10 × 7 feet.

GUARANTEED CAPACITY IN 10 HOURS:

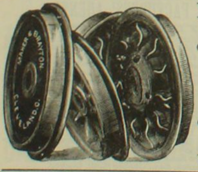
No. 30.—New Chilled Iron Wheels, 33 inches diameter, bored, ground and paired if ⅛ inch defective.
No. 15.—New Chilled Iron Wheels, 42 inches diameter, bored, ground and paired if 3-16 inch defective.
No. 6.—New Steel or Steel-tired Wheels, 33 inches diameter, bored, turned and paired if ⅛ inch defective.
No. 4.—New Steel or Steel-tired Wheels, 42 inches diameter, bored, turned and paired if ⅝ inch defective.
No. 6.—Worn Steel or Steel-tired Wheels, 33 inches diameter, centered, turned and paired if ⅛ inch defective, tread and flange.
No. 4.—Worn Steel or Steel-tired Wheels, 42 inches diameter, centered, turned and paired if ⅝ inch defective, tread and flange.

Special Abrading Wheels of Superior Quality, for Chilled Iron Surface, Car-Wheel Grinding and General Shop Use Guaranteed.

For further particulars address

M. C. BULLOCK MANUFACTURING COMPANY, 199 LAKE STREET, CHICAGO, ILL.

CLEVELAND WHEEL AND FOUNDRY WORKS,



MAHER & BRAYTON, Proprietors.

MANUFACTURERS OF

CAR, ENGINE, TRUCK AND TENDER WHEELS, RAILROAD, ROLLING-MILL AND MACHINERY CASTINGS, AND STREET RAILROAD WHEELS AND TURNOUTS.

ALSO,

CHILLED-FACED RAILROAD FROGS.

Office: 20 Carter Street.

Works: Cor. Carter and Collins Streets, Cleveland, O.

KNOXVILLE CAR WHEEL CO.,

Knoxville, Tenn.,

MANUFACTURE

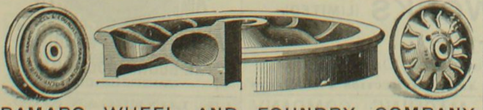
CHILLED WHEELS FOR CARS,

ENGINE TRUCKS AND TENDERS,

USING STRICTLY

COLD BLAST CHARCOAL IRON,

Made at their Celebrated Carter Co. Furnaces.



RAMAPO WHEEL AND FOUNDRY COMPANY,

MANUFACTURERS OF

Chilled Wheels for Drawing-Room and Sleeping Coaches, Locomotives, Tenders, Passenger and Freight Cars.

GEO. CHURCH, President and Treasurer. W. W. SNOW, Superintendent and General Manager.

RAMAPO, ROCKLAND COUNTY, N. Y.

DAVENPORT & FAIRBAIRN,

ERIE, PA.

MANUFACTURERS OF

CAR WHEELS.

Capacity 350 Wheels per day. Wheels made by improved process. Far more durable than those made in the ordinary way.

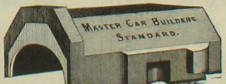
Manganese Bronze and Brass Castings,

STRONGEST AND BEST IN THE MARKET.

FOR

ROLL NECK CAR JOURNAL

AND MACHINERY BEARINGS,


MASTER CAR BUILDERS STANDARD.

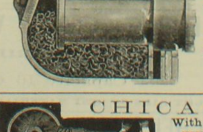
ALSO,

Babbitt's Anti-Friction

METAL

MANUFACTURED BY

JOHN FITZSIMMONS BRASS FOUNDER 23 CARSON ST., PITTSBURGH, PA.



THE HEWITT BOX-LID CO.,

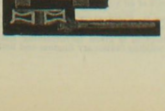
142 DEARBORN ST.,

CHICAGO, ILL.

Eastern Office: Room 14, Fifth Floor, Mills Building, New York.

We respectfully refer you to the following railroads using the Hewitt Cover:

K. C., Ft. J. & C. B.; M. R., Ft. S. & G.; C., B.& Q.; C., A. & St. A., T. & S. F.; A. & N.; K. P.; F. & P. M.; D., L. & N.; D. & C.; M. C.; H. & St. J.; C. & V.; St. L., I. M. & S.; B. & M. R. (in Neb.); D.P.; L. L. & G.; L. E. & W.; L. P. & C.; I. C.; O. C.; St. L. V. & T. H.; St. P. & S. C.; N. P.; C. & E. I.; M. P.



CHICAGO CAR MOVER.

With it One Man can move a loaded car.

WEIGHT, including Handle, 15 lbs.

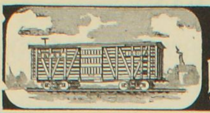
Guaranteed not to break or get out of order. Sent on 30 days' trial. Send Postal for Sample, and you will use no other.

Price, Single Movers, $6.00; Per Pair, $10.00.

Special discount to Railway Companies.

Address J. H. BANNON, Manufacturer.

Room 62, 220 S. Clark St., Chicago, Ill.

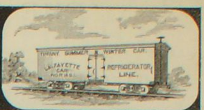


B. F. MASTEN, PREST. C. E. GORE, SUPT.

LA-FAYETTE CAR WORKS

LA FAYETTE, IND.

FREIGHT, CABOOSE & REFRIGERATOR CARS. OF ALL KINDS. PUSH CARS HAND & WAREHOUSE TRUCKS & BAGGAGE BARROWS. CAR WHEELS & CASTINGS



NATIONAL EXPOSITION OF RAILWAY APPLIANCES · CHICAGO 1883 ·

SILVER MEDAL
AWARDED TO
E. L. BUSHNEL
Po'keepsie, N. Y.
FOR THE BEST
SEAT, BACK AND
BERTH SPRINGS

Po'keepsie N. Y
No. 320 Wabash Avenue, Chicago, Ill.

Patentee and manufacturer of Springs for Plain and Double Spring Edged Seats, Backs, Berths and Mattresses. The Only Springs Awarded a Prize at the National Exposition. Adopted and used by nearly all the leading railroads and car-builders in the United States and Canada. Also for beds throughout the country. Circulars, reference and samples free.

HOWARD IRON WORKS.

BUFFALO N. Y.,
MANUFACTURERS OF
Schlenker's Automatic Revolving Die Bolt Cutter and Nut Tapping Machine
ADAPTED SPECIALLY FOR RAILROAD USES

HARRISBURG CAR MANUFACTURING CO.

MANUFACTURE
PASSENGER MAIL, BAGGAGE
BOX, GONDOLA, COAL
AND ALL OTHER KINDS OF
RAILROAD CARS;

Railroad Car Wheels and Castings, Bridge and Rolling Mill Castings, Bridge Rods, Bolts and

RAILROAD FORGINGS.

Wrecking and Construction Car.

All the main features, such as leveling car, turn table, self-adjustable step for vertical post, twenty feet hoist, working over embankments, swinging load—car body or more—direct on to freight car, hinged jacks, direct grapples to rail, and other important features, all perfected and patented by Jewett, foreman of a wrecking gang for many years.

For further information apply to the builder,

HARRISON LORING,
Boston, Mass.

NOTICE.—To build an efficient wrecking car, many of the main features of this car would have to be incorporated into it, which would be an infringement of my patents. Such cars are being built by the undersigned (having special tools for the work) at very reasonable prices, and no charge made for the patent rights, which would have to be paid for by the user if made by an unauthorized person.

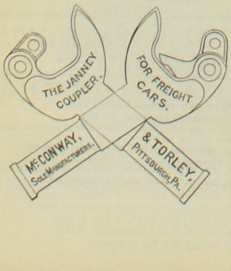
HARRISON LORING.

JOHN T. LEWIS & BROS.
WARRANTED
PURE
WHITE
LEAD.
PHILADA.

TRADE MARK.

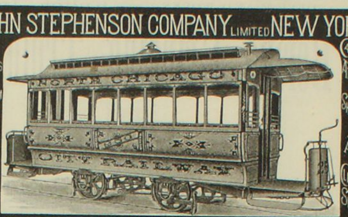
No. 231 South Front Street.

Manufacturers of White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil and Painters' Colors.


THE JANNEY COUPLER.
FOR FREIGHT CARS.
McCONWAY,
SOLE MANUFACTURERS.
& TORLEY,
PITTSBURGH, PA.

JOHN STEPHENSON COMPANY LIMITED NEW YORK.

BEST MATERIALS MINIMUM PRICES ORDERS QUICKLY FILLED



CAREFUL ATTENTION TO SHIPMENTS ALL CLIMATES SUITED

TRAMWAY CARS OF EVERY DESCRIPTION.
LIGHT, ELEGANT, DURABLE.

BRADLEY CAR WORKS, WORCESTER, MASS.

ESTABLISHED 1833.
MANUFACTURERS OF EVERY DESCRIPTION OF
RAILWAY CARS.
OSGOOD BRADLEY & SONS, Proprietors.
NEW YORK OFFICE No. 115 Broadway, R. CANNING, Agent.

I. N. PENNOCK. W. PENNOCK.

PENNOCK BROS.,

MANUFACTURERS OF
RAILWAY CARS,
MINERVA, OHIO.

TIFFANY REFRIGERATOR CAR CO.,

164 DEARBORN ST., CHICAGO, ILL.
1,500 in Use.

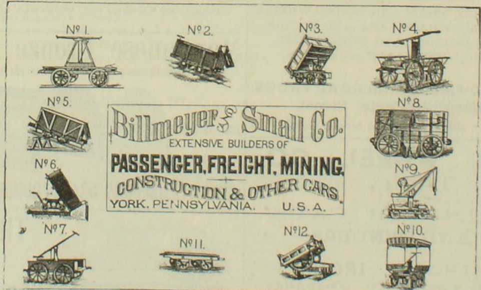
GEO. WESTINGHOUSE, JR., President
A. T. ROWAND, Secretary.
ROBERT PITCAIRN, Treasurer.
W. T. TAGGART, Superintendent.
C. H. JACKSON, Vice-President.
ELMER L. WHITE, Asst. Secretary.

THE STANDARD CAR HEATING AND VENTILATING COMPANY,

MANUFACTURERS OF
STEAM HEATING AND VENTILATING APPARATUS
FOR
RAILWAY CARS.

Now in use on several of the most important Railway Lines of the Country. Full information and catalogue upon application.

OFFICE and WORKS, Duquesne Way and Garrison Alley, PITTSBURGH, PA.


Nº 1.
Nº 2.
Nº 3.
Nº 4.
Nº 5.
Nº 8.
Nº 6.
Nº 9.
Nº 7.
Nº 11.
Nº 12.
Nº 10.

Billmeyer & Small Co.
EXTENSIVE BUILDERS OF
PASSENGER, FREIGHT, MINING,
CONSTRUCTION & OTHER CARS
YORK, PENNSYLVANIA. U. S. A.

ERIE CAR WORKS [LIMITED].

ERIE, PA.
Capacity 16 Cars Per Day.
FREIGHT CARS OF BEST MATERIAL, AND CONSTRUCTION A SPECIALTY

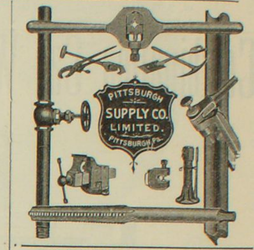
LITCHFIELD CAR AND MACHINE COMPANY,

LITCHFIELD, ILLINOIS.

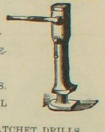
Manufacturers of all kinds of Passenger and Freight Equipment, both Wide and Narrow Gauge.

CAR WHEELS A SPECIALTY IN THE MACHINERY DEPARTMENT.

Especial attention is given to furnishing Hoisting Engines, Pit Cars, Dumps, etc., etc., for Coal Mines, as well as building Stationary Engines and Boilers, and General Brass and Sheet-Iron Work.


PITTSBURGH
SUPPLY CO.
LIMITED.
PITTSBURGH PA.

TANGYE'S HYDRAULIC JACKS.



BALL'S TELESCOPE JACKS.
SCREW RAIL BENDERS.
HYDRAULIC RAIL BENDERS.
WESTON'S RATCHET DRILLS.

Wrought-Iron Blocks for rope, chain and wire rope.

McCOY & SANDERS,
26 WARREN ST., NEW YORK.

THE STANDARD LUBRICATING OIL OF AMERICA FOR RAILROADS.

GALENA
ENGINE, COACH AND CAR OIL.
Gravity, 26°, 27°, 28°, 29°. Cold Test, 10° to 15° below zero.

No freezing in coldest weather, and entire freedom from hot journals at any time, as its exclusive use upon a majority of the leading railroads has demonstrated.

Showing Better Results than any Oil Extant
REFERENCES FURNISHED ON APPLICATION.
GALENA OIL WORKS (Limited),
FRANKLIN, PA

Australia, New South Wales.

CARSON WOODS & CO.,

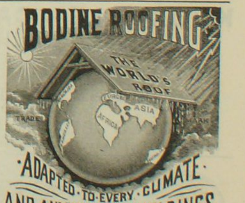
GENERAL MERCHANTS,
IMPORTERS OF
AMERICAN SPECIALTIES AND MANUFACTURERS' AGENTS.
SYDNEY, N. S. W.

The attention of Manufacturers and Export Agents is invited to the fact that the advertisers have special facilities for the introduction of new goods into the colonies of Australia. Patents and specialties of a useful and merchantable character will have our earnest and prompt consideration.

Cable Address: **"Carsonwood, Sydney."**

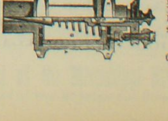
REFERENCES:

HON. GEO. R. DIBBS M. P., Treasurer, Government N. S. W.
Messrs. HENEY & LACROIX, Montreal, Can.
Messrs. H. W. PEABODY & Co., Boston, Mass.
LYON MANUFACTURING Co., New York.
Manager Bank New Zealand, Sydney.
WM. BROWN, Esq., Quebec Bank, Quebec.



AND ANY KIND OF BUILDINGS
MANUFACTURED BY
"THE BODINE ROOFING CO."
MANSFIELD, OHIO.

J. E. LONERGAN & CO.



Patent Oilers for Loco. Guides, Rods and Cylinders. Brass Founders and Finishers.

211 Race st.,
Philadelphia.

Catalogue free

F. W. THAYER. A. S. HOWELL.

THAYER, HOWELL & CO.,

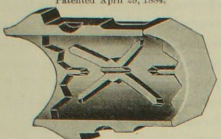
SOLE MANUFACTURERS OF OUR OWN

PATENT RAILROAD JOURNAL BEARINGS,

"SUPERIOR" BRONZE AND "ANTI-FRICTION" METALS.

418 to 428 FOWLER STREET, - - - - - - - - - MILWAUKEE, WIS.

Patented April 29, 1884.



This Bronze Shell, filled with our **"NICKEL ANTI-FRICTION,"** is producing immense mileage on all railroads now using, among them the **Chicago, Milwaukee & St. Paul Railway,** who have adopted over all others, and to whom we are pleased to refer by permission.

Our "Anti-Friction" Metal is **UNSURPASSED** as a lubricator, under any pressure, slow or greatest speed.

OUR "SUPERIOR BRONZE" we warrant unsurpassed by that of any other so-called Bronze or composition Metal for bearings and miscellaneous purposes. We will furnish this metal in Castings or Ingot, as may be desired, and respectfully solicit your correspondence. We have as large a Smelting Capacity as any Foundry in Brass and Bronze in the country, and are able to **FILL ALL ORDERS PROMPTLY.**

Please request our prices (f. o. b. anywhere in United States) on Bearings, Brass and Bronze Work, Anti-Friction Metal in Pigs, etc., etc.

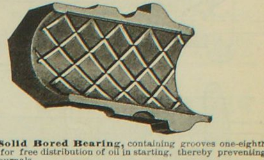
Bearings for Tests Furnished Gratis.

No Charge Made for Patterns.

WE REFER TO WESTERN RAILROAD ASSOCIATION AS TO VALIDITY OF PATENTS.

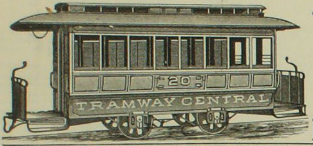
Car-Builders will find it Advantageous to Communicate with Us.

Patented March 17, 1885.



This is a **Solid Bored Bearing,** containing grooves one-eighth inch deep for free distribution of oil in starting, thereby preventing many hot journals.

The above, when made from our "Superior" Bronze, and lined with our "Nickel Anti-Friction," produces a bearing which recent severe tests have convinced our customers to be the best yet, as a prominent Railroad Manager says, "The 'gilt edged' Bearing of America, yielding in its nature and **not wearing the journal, yet resisting self-wear** better than any other Bearing I ever saw."

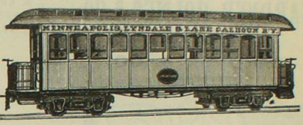


J. G. BRILL & CO.,

PHILADELPHIA

BUILDERS OF

RAILWAY AND TRAMWAY CARS.


MINNEAPOLIS, LYNDALE & LAKE CALHOUN R'Y.

FRANK J. HECKER, President. C. L. FREER, Secretary and Treasurer.

PENINSULAR CAR COMPANY.

NEW WORKS AND FOUNDRIES. MODERN TOOLS AND MACHINERY.

FREIGHT CARS OF ALL CLASSES. CAR WHEELS AND CASTINGS.

CAPACITY, - - - - - - - - - - - - 30 CARS PER DAY.

DETROIT, MICHIGAN.

A. HEGEWISCH, President.
THOS. F. B. Parker, Secy. } New York, N. Y.

C. BENN, Treasurer.
W. H. CHADDOCK, Genl. Agt., } Chicago, Ill.

THE UNITED STATES ROLLING STOCK COMPANY,

General Offices, 35 Wall St., N. Y.; Works, Chicago, Ill., and Urbana, Ohio,

Offers for lease to Railroads, Freight Lines, Mining Companies and others, Locomotive Engines, Box, Stock, Gondola, Dump, Flat and Refrigerator Cars,

And is Prepared to Build for LEASE and on Contract for CASH, or under the CAR-TRUST SYSTEM, such ROLLING STOCK as may be Required.

MICHIGAN CAR COMPANY,

JAMES McMILLAN, President.
HUGH McMILLAN, V. Pres. and Gen. Manager.
JAMES McGREGOR, General Superintendent.

MANUFACTURERS OF

RAILROAD FREIGHT CARS and "TIFFANY"

and all Other Successful Beef and Dairy Cars.

H. W. DYAR, Assistant Man.
W. K. ANDERSON Treasurer.
JOSEPH TAYLOR Secretary.

Office: Newberry & McMillan Building, Detroit, Mich.

DETROIT CAR WHEEL COMPANY,

Manufacturers of

LOCOMOTIVE AND CAR WHEELS, RAILROAD AND OTHER CASTINGS.

JAMES McMILLAN, President.
HUGH McMILLAN, V. Pres. and Gen. Manager.

DETROIT, MICH.

J. H. WHITING, Superintendent.
W. K. ANDERSON, Secretary and Treasurer.

BAUGH STEAM FORGE COMPANY,

Manufacturers of all Descriptions of

CAR AND DRIVING AXLES, COUPLING LINKS AND PINS, SHAFTINGS DRAW BARS ETC.

JAMES McMILLAN, President.
HUGH McMILLAN, V. President.
JOHN B. BAUGH, General Manager.

Works on River Road, Below City,

DETROIT, MICH.

SAMUEL A. BAUGH, Superintendent.
W. K. ANDERSON, Treasurer.
R. D. FIELD, Secretary.

DETROIT IRON FURNACE COMPANY.

LAKE SUPERIOR CHARCOAL PIG IRON,

FOR CAR-WHEEL AND MALLEABLE USE.

JAMES McMILLAN President
HUGH McMILLAN, Vice-Pres. and Treas.

DETROIT, MICH.

LEE BURT, Manager.
E. C. WETMORE, Secretary.

FULTON IRON AND ENGINE WORKS,

DETROIT, MICHIGAN.

Fulton's Special Bronze Boxes for Passenger Cars

Bronze Journal Metal for Freight Cars, Hopkins Lead-Lined Bearings, Clamer's Ajax Journal Metal.

JAMES McMILLAN, Prest. I. DEGRAFF, Mgr. M. T. CONKLIN, Treas. HUGH McMILLAN, Secy.

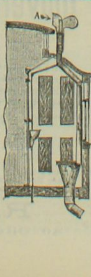
CLEVELAND, COLUMBUS, CINCINNATI & INDIANAPOLIS RAILWAY,

Evening trains leave CLEVELAND daily with Rotunda Sleeping Cars for COLUMBUS, CINCINNATI, INDIANAPOLIS, LOUISVILLE, TERRE HAUTE, EVANSVILLE, ST. LOUIS and all points West and South. Morning trains leave Daily, except Sunday, with Through Palace Coaches, for COLUMBUS, CINCINNATI, INDIANAPOLIS, LOUISVILLE, and ST. LOUIS without change. This is the only line making direct communication with all the Principal Trunk Lines of the East for NASHVILLE, MEMPHIS, NEW ORLEANS and all points in Texas, either by way of LOUISVILLE or ST. LOUIS. Direct connection at ST. LOUIS for all Railway Towns in Kansas, Nebraska and Colorado

Equipment Comprises all Valuable Improvements.

THE BEST ROAD-BED AND SAFEST ROAD IN THE WEST.

E. B. THOMAS, General Manager. A. J. SMITH, General Ticket Agent.



THE DETROIT VENTILATOR,

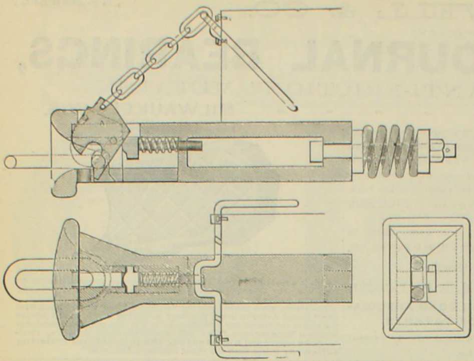
Which carries a powerful Current of Air directly through the Urinal and Hopper on Passenger Cars and Steamboat Closets while in motion or standing, hence doing away with all mephitic odors, to the health and comfort of their patrons.

McGOVERN & WILLSON,

PROPRIETORS,

185 Thirteenth Street, - - 64 Baker Street,

DETROIT, MICH.



THE CURTIS & WOOD AUTOMATIC COUPLER COMPANY,

140 S. FOURTH STREET, PHILADELPHIA, PA.

The most complete, simple, durable and effective Automatic Freight Car Coupler. It is in actual and satisfactory use on some of the principal railroads. Automatic and certain, it insures absolute safety in coupling and uncoupling, and makes it unnecessary for trainmen to go between cars. It costs but little more than the ordinary link-and-pin coupling. It will couple to any draw-head, and can be adjusted to any draft rigging, or will take the place of any draw-bar now in use. We will equip cars for trial by any railroad desirous of testing the coupler on its merits. For full information, address

L. L. BUSH, President. **ROBERT R. CORSON, Vice-Pres.**

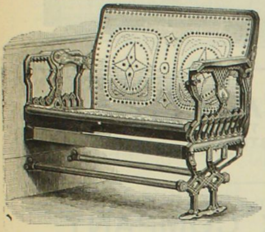
ADDRESS ALL BUSINESS LETTERS TO

WILLIAM H. CRESSON, Secretary.

GARDNER, HOLMES & CO.

SUCCESSORS TO

GARDNER & CO.



PATENTEES AND MANUFACTURERS OF

PERFORATED

Veneer Car Seats,

FOR STEAM AND STREET CARS,

DEPOT SEATING.

3-PLY

Veneer Car Ceiling.

Birch Veneer a specialty, any size panel, without joint, plain and decorated.

STREET CAR PANELS.

SEND FOR R. R. CATALOGUE.

183 Canal St., New York.

IRON CLAD PAINT.

TRADE
IRON CLAD PAINT
MARK.

Trade-Mark Patented.

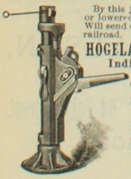
This Paint is used by nearly all the Railroads in the Country.

Used by L. S. & M. S., Wabash R'y, C., C., C. & I. R'y, C. & P. R'y, C., H. & D. R. R., Cincinnati Southern R'y, N. Y., L. E. & W. R'y. (Erie), Southern Central R. R., Canada Southern, Mobile & Ohio, N. O & Mobile, Macon & Brunswick, Penn. R. R., C., M. & St. P. R'y A. & N. R'y, R. & D. R'y Carolina Central, P., C. & St. L. R'y, P. & E. R. R., M., L., S. & W. R'y, K. & D. M. R'y, W. C. & A. R. R., M., I. & N. R'y, N. C. & St. L., N. I. & E. R. R., I. & G. N. R R., etc., etc.

IRON CLAD PAINT CO. Cleveland Ohio.

HYDROSTATIC

R. R. CAR JACK.



By this jack cars can be raised or lowered at any desired speed. Will send on 30 days' trial to any railroad.

HOGELAND & ANDERSON
Indianapolis, Ind.

C. I., St. L. & C. Ry. Co.,
Indianapolis, Sept. 2, '84.
Messrs. HOGELAND & ANDERSON.

Gentlemen: We have been using your jacks for nearly three months, with excellent results. Our men prefer them to any other by long odds.

J. F. RICHARDS,
Foreman.

J. W. KREPPS.
V. A. KREPPS.
C. C. KREPPS.

KREPPS BROTHERS
INVESTMENTS.
PROMOTERS & BROKERS.

DUNCAN BUILDING,
No. 11 PINE ST.,
NEW YORK.

Make a specialty of introducing MERITORIOUS inventions DIRECT to Railway Companies. Organizing Stock Cos. for the Mfg. of Ry. Appliances. "Bonds and other securities negotiated."

CORRESPONDENCE SOLICITED.

THE AJAX METAL COMPANY

Trade Mark.

CLAIM FOR "AJAX METAL"

1st: 25 to 50 per cent. more mileage.
2d: 33⅓ per cent. greater tensile strength and 100 per cent. greater crushing strength.
3d: 20 per cent. less friction and wear upon journal.
4th: 85 per cent. less hot journals than any known alloy
5th: Costs no more than copper and tin or gun metal.

Castings made to order as per patterns received.

OFFICE AND WORKS; 2040 NORTH 10th STREET,
PHILADELPHIA, PA.

J. G. HENDRICKSON, } Copartners.
J. F. CLAMER, }

THE THURMOND

Automatic Car Coupler,

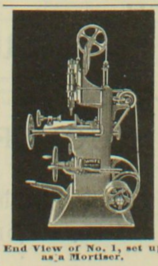
FOR FREIGHT AND PASSENGER CARS.

This Coupler is of the **"Vertical Hook Type,"** and has no springs. Its means of Locking is Gravity.

Guaranteed to couple on the sharpest curves to cars of different heights and styles.

It requires no fitting—ready from the molds to apply to cars. Draw-bar weighs from 80 to 120 pounds in malleable iron, and from 150 to 180 pounds in cast iron. It is Automatic in locking and unlocking, and is always ready for use. Cheap, safe and reliable. Address

W. H. THURMOND, Forsyth, Monroe County, Ga.



End View of No. 1, set up as a Mortiser.

Universal Wood Worker.

PATENTED APRIL 3, 1883.

THREE MORE PATENTS APPLIED FOR.

The simplest and best Router or Mortising Machine, Boring Machine, Straight Sticker or Variety Moulder, Engraving and Rosette Machine and Window Pulley Mortiser ever invented.

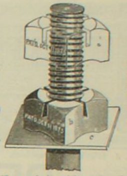
The No. 3 is the most useful Machine ever invented for

CAR-BUILDERS' USE.

Don't fail to send for illustrated catalogue and full particulars Every Machine warranted and sample work sent to any address in the United States, express on samples paid by me.

R. T. WHITE,
40 Oliver Street, BOSTON, MASS.

Atwood Safety Nut Co.,
Springfield, Mass.

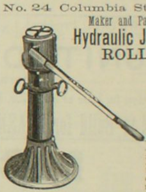


J. W. LARABEE,
Treasurer.

a. ATWOOD NUT on bolt without bearing on base slots open.
b. ATWOOD NUT turned to bearing *c* partially closing the slots and grasping the bolt.

RICHARD DUDGEON,

No. 24 Columbia St., New York,



Maker and Patentee of IMPROVED

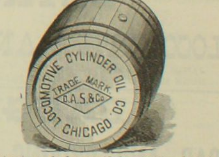
Hydraulic Jacks, Punches
ROLLER-TUBE
EXPANDERS,
AND
DIRECT ACTING
Steam
Hammers.

JACKS FOR PRESSING ON CAR-WHEELS OR CRANK PINS MADE TO ORDER. Communications by letter will receive prompt attention.

THE LOCOMOTIVE CYLINDER OIL CO.,

MANUFACTURERS OF

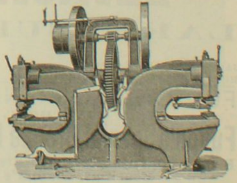
Railroad Valve Oil.



Contracts made for specified quantities, deliverable, as required, at any depot in the United States or Canada.

Samples for trial, etc., will be cheerfully furnished on application to

D. A. STUART & CO.,
Agents Wanted. Chicago, Ill.



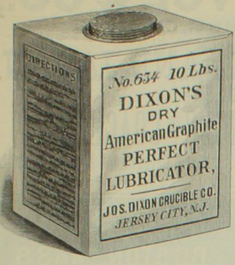
Power Punches, Shears & Hammers.

We make over 100 sizes of Punches and Shears, Double and Single, varying from 500 to 36,000 pounds in weight, and adapted for every variety of work. The Double machines are equal to two Single ones, as each side is worked independently. Also

ADJUSTABLE HELVE
CUSHIONED HAMMERS

Of all sizes, Unequaled for Efficiency and Durability

THE LONG & ALLSTATTER CO.
Hamilton O.



DIXON'S

PERFECT LUBRICATOR.

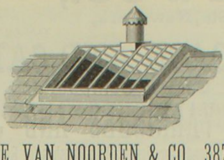
Graphite is in dry flake.
It has unrivaled smoothness and endurance.
It is not affected by heat, cold, steam, acids, etc.
It must be absolutely pure.
Can be used dry for steam cylinders or "blowing" cylinders.
Mix it with oil for light bearings.
Mix it with grease for heavy bearings.
Equally good for wood or metal surfaces.
Specially useful for heaviest work, as mill steps, gears, bed plates, etc.
Dixon's Graphite fulfills all the above conditions.
Send for sample and price list.

Manufactured and Warranted only by the

Joseph Dixon Crucible Co.,

JERSEY CITY, N. J.

METAL VENTILATING SKYLIGHTS.



Absolutely free from leakage or condensation. **Fire, storm and weather-proof.** Bars and framework provided with a system of gutters which carry all drip or sweating from underside of glass, and conduct it out to roof. Riveted and soldered joints. **Leaking or dripping guaranteed impossible.**

Skylights and Glass furnished and put up by us in all parts of the country.

The Garry Iron Roofing and Corrugated Iron Roofing and Siding.

E. VAN NOORDEN & CO., 387 Harrison Avenue, BOSTON, MASS.

BOUND VOLUMES OF
THE NATIONAL CAR - BUILDER
For 1880, 1881, 1882, 1883 and 1884.
PRICE, - - - $3.00 EACH.

Index to Advertisements in the National Car-Builder.

PAGE.

Air Brakes:
The American Brake Co., St. Louis, Mo. (cover) 1
Westinghouse Air Brake Co., Pittsburgh, Pa. (cover) 1

Axles:
Baugh Steam Forge Co., Detroit, Mich. vii
Lang, W. Baily, New York and Boston xxii
Midvale Steel Co., Philadelphia, Pa. iii
New Albany Steam Forge, New Albany, Ind. xvi
Patent Shaft & Axletree Co., N. Y. (cover) 4

Balance Slide Valves:
Richardson, F. W., Troy, N. Y. (cover) 4

Bell Cord and Couplings:
Wellington, Henry W., Boston, Mass. ii

Boudoir Cars:
Mann Boudoir Car Co., New York, N. Y. xi

Boiler Plate:
Ewald Iron Co., St. Louis Mo. xii
Shoenberger & Co., Pittsburgh, Pa. x

Bolt Cutters:
Howard Iron Works, Buffalo, N. Y. vi

Brake Beam (Steel):
Marden Brake Beam Co., Boston, Mass. xiv

Cars:
Billmeyer & Small Co., York, Pa. vi
Bradley Car Works, Worcester, Mass. vi
Brill, J. G. & Co., Philadelphia, Pa. vii
Carlisle Mfg. Co., Carlisle, Pa. iii
Erie Car Works (Limited) vi
Ensign Manufacturing Co., Huntington, W. Va. iii
Harlan & Hollingsworth Co., Wilmington, Del. iii
Harrisburg Car Mfg. Co., Harrisburg, Pa. vi
La Fayette Car Works, La Fayette, Ind. vi
Lehigh Car Mfg. Co., Stemton, Pa. iii
Litchfield Car and Machine Co., Litchfield, Ill. vi
Loring, Harrison, Boston, Mass. vi
Michigan Car Co., Detroit, Mich. vii
Pardee Car Works (Limited), Watsontown, Pa. iii
Peninsular Car Works, Detroit, Mich. vii
Pennock Bros., Minerva, Ohio. vi
Roanoke Machine Works, Roanoke, Va. ii
Southern Car Works, Knoxville, Tenn. iii
Stephenson, The John Co. (Limited), N. Y. vi
Tiffany Refrigerator Car Co., Chicago, Ill. vi
U. S. Rolling Stock Co., New York, N. Y. vii
Wason Manufacturing Co., Springfield, Mass. iii

Car Brakes:
Laufman Screw-Brake Co., Minneapolis, Min. xx

Car Brake Shoes:
Congdon Brake Shoe Co., Chicago, Ill. (cover) 3

Car Couplings:
Ames Car Coup. Co., Philadelphia, Pa. (cover.) 2
Cowell Platform & Coupling Co., Cleveland, O. xiv
Curtis & Wood, Philadelphia, Pa. viii
McConway, & Torley, Pittsburgh, Pa. vi
Thurmond Auto. Car Coupler, Forsyth, Ga. viii
U. S. Car Coup. Co., Boston, Mass. (cover) 4

Car Heaters:
Standard Car Heat. & Ven. Co., Pittsburgh, Pa. vi

Car Jacks:
Hogeland & Anderson, Indianapolis, Ind. viii
Springfield Foundry Co., Springfield, Mass. (cover) 4

Car Movers:
Bannon, J. H., Chicago, Ill. v

Car Pushers:
Penfield Block Co., Lockport, N. Y. ix

Car Seats:
Bundn, Geo. & Co., Philadelphia, Pa. (cover) 1
Gardner, Holmes & Co., New York, N. Y. viii
Hale & Kilburn Mfg. Co., Phila., Pa. xviii

Car Seat Springs:
Bushnell, E. L., Poughkeepsie, N. Y. vi

Car Springs:
Andrews & Clooney, New York, N. Y. (cover) 3
Cliff & Righter Co., New York, N. Y. (cover) 1
Davis, A. B., Car Spring Co., Phil., Pa. (cover) 3
Diamond State Car Spring Co., Wilmington, Del. (cover) 3
French, A., Spring Co., Pittsburgh, Pa. 1
Jeffries, J. & Son, Philadelphia, Pa. (cover) 3
Kaldenberg, Frederick J., New York, N. Y. ix
Miller, Metcalf & Parkin, Pittsburgh, Pa. (cov) 3
National Car Spring Co., N. Y. (cover 1) and p. xvi
Pickering, C. W. & Co., Philadelphia, Pa. (cover) 3
Scott, Chas., Philadelphia, Pa. (cover) 3

Car Wheels:
Allen Paper Car-Wheel Co., New York, N. Y. iv
Andrews & Clooney, New York, N. Y. (cover) 3
Baltimore Car Wheel Co., Baltimore, Md. v
Bass Foundry & Machine Works, Ft. Wayne, Ind. iii
Bowler & Co., Cleveland, O. ii
Cayuta Wheel & Foundry Co., Sayre, Pa. iii
Davenport & Fairbairn, Erie, Pa. v
Detroit Car Wheel Co., Detroit, Mich. vii
Dickson Mfg. Co., Scranton, Pa. iv
Ellis, W. R., New York & Boston (cover) 4
Griffin Car Wheel Co., Detroit, Mich. (cover) 4
Griffin, Thomas F. & Sons, Buffalo, N. Y. (cover) 4
Griffin & Wells Foundry Co., Chi., Ill. (cover) 4
Jersey City Wheel Foundry & Mach. Works, Jersey City, N. J. iv
Knoxville Car Wheel Co., Knoxville, Tenn. v
Lobdell Car-Wheel Co., Wilmington, Del. iii
Maher & Brayton, Cleveland, O. v
Mowry Car Wheel Works, Cincinnati, O. iii
Paige Car Wheel Co., Cleveland, Ohio iv
Ramapo Wheel & Foundry Co., Ramapo, N. Y. v
Roanoke Machine Works, Roanoke, Va. v
Rochester Car Wheel W'ks, Roch., N. Y. (cov) 4
Taylor Iron Works, High Bridge, N. J. iii
Wason Manufacturing Co., Springfield, Mass. vii
Whitney, A. & Sons, Philadelphia, Pa. iii

Chains:
Box, Alfred & Co., Philadelphia, Pa. (cover) 2

Chilled Car Wheel Grinding:
Bullock, M. C., Manuf. Co., Chicago, Ill. v
Chilled Car Wheel Grinding Co., Carson, Nev. iv

Clamps:
Armstrong, F., Bridgeport, Ct. xiii

Corrugated Sheet Iron:
Cincinnati Corrugating Co., Cincinnati, O. (cover) 2

Crucibles:
Dixon Crucible Co., Jersey City, N. J. ix

Draughtsman's Materials:
McAllister, Oswald, Philadelphia, Pa. (cover) 4

Draw-Bars:
Safford, J. B., Buffalo, N. Y. ii

Engines:
Cummer Engine Co., Cleveland, O. ii

Exhaust Fan:
Buffalo Forge Co., Buffalo, N. Y. (cover) 2

Fire Box Steel:
Schoenberger & Co., Pittsburgh, Pa. x

Flexible Shafts:
Stow Flexible Shaft Co. (Lim.), Phil., Pa. xviii

For Sale—Locomotives and Cars:
Cochnower & Co., Boston, Mass. (cover) 3

For Sale—Street Railway Cars:
People's Pass. Ry. Co., Philadelphia, Pa. xiii

Forges:
Buffalo Forge Co., Buffalo, N. Y. (cover) 2
Empire Portable Forge Co., Cohoes, N. Y. xxii

Frogs & Crossings:
Cleveland Frog & Crossing W'ks, Cleveland, O. x
Union Switch & Signal Co., Pitts., Pa. (cover). 1

Hand-Car:
Sheffield Velocipede, Peabody, H. W., & Co., Boston, Mass. xxii

Hoisting Engines and Boilers:
Lidgerwood Mfg. Co., New York, N. Y. ii

Hydraulic Jacks:
Dudgeon, R., New York, N. Y. viii
Justice, Philip S. & Co., Philadelphia, Pa. x
Watson & Stillman, New York, N. Y. xxii

Injectors:
Nathan Mfg. Co., New York, N. Y. (cover) 2
Sellers, Wm. & Co., Philadelphia, Pa. (cover) 2

Interlocking Switches:
Union Switch & Signal Co., Pittsburgh, Pa. (cov.) 1

Investments:
Krepps Bros., New York, N. Y. viii

Journal Bearings:
Ajax Metal Co., Philadelphia, Pa. viii
American Bronze Works, Cleveland, O. (cover) 3
Damascus Bronze Co., Pittsburg, Pa. xii
Fitzsimmons, J., Pittsburgh, Pa. v
Fulton Iron & Engine Works, Detroit, Mich. vii
Hopkins, D. A., 113 Lib'ty st., New York, N. Y. xvi
Meneely, George R. & Co., W. Troy, N. Y. x
Phosphor-Bronze Smelting Co. (Limited), Philadelphia, Pa. xii
Ryan, J. J. & Co., Chicago, Ill. x
Thayer, Howell & Co., Milwaukee, Wis. vii

Journal Box:
Raoul Journal Box Co., Ramapo, N. Y. (cover) 3

Journal Box Lids:
Hewitt Box Lid Cover Co., Chicago, Ill. v

Laundry:
Oceanic Steam Laundry Co., Jersey City, N. J. (cover) 4

Locomotives:
Pittsburgh Loco. & Car W'ks., Pittsburgh, Pa. xii
Porter, H. K. & Co., Pittsburgh, Pa. xii
Rhode Island Loco. Wks., Providence, R. I. xii
Rogers Loco. & Mach. W'ks, Paterson, N. J. xii
Schenectady Locomotive Works, N. Y. xii

Lubricators:
Lonergan, J. E. & Co., Philadelphia, Pa. vi

Lubricants:
Noyes Manufacturing Co., Boston, Mass. i
Seibert Cylinder Oil Cup Co., Boston, Mass. xiii
Smith, E. A. & Co., Pittsburgh, Pa. ii
Urquhart, John S., New York, N. Y. ii

Lumber:
Vanderbilt & Hopkins, New York, N. Y. ii

Manufacturers' Agents:
Carson, Woods & Co., Sidney, N. S. Wales. vi

Machinists' Tools:
Bement, Miles & Co., Phila., Pa. (cover) 2
Betts Machine Co., Wilmington, Del. (cover) 2
Box, Alfred & Co., Philadelphia, Pa. xvi
Brown & Sharpe, Providence, R. I. (cover) 2
Flanders, L. B., Machine Works (Pedrick & Ayer), Philadelphia, Pa. xiii
Forsaith, S. C., Mach. Co., Manchester, N. H. ii
Hilles & Jones, Wilmington, Del. (cover) 2
Niles Tool Works, Hamilton, O. (cover) 4
Pratt & Whitney Co., Hartford, Conn. (cover) 2
Sellers, Wm. & Co., Philadelphia, Pa. (cover) 2
Shimer, Samuel J., Milton, Pa. ii
Stow Flex. Shaft Co. (Limited), Phila., Pa. xviii

Mahogany, Fancy Woods & Veneers:
Albro Co., The E. D., Cincinnati, O. i
Graham, John R., New York, N. Y. (cover) 1
Uptegrove, Wm. E. & Bro., New York, N. Y. (cover) 4

Malleable Iron:
Cleveland Malleable Iron Co. xi

Matcher Heads:
Shimer, Samuel J., Milton, Pa. ii

Nuts:
R. I. Tool Co., Providence, R. I. xi

Nut-Locks:
Atwood Safety Nut Co., Springfield, Mass. viii
Dwight Nut-Lock Co., Springfield, Mass. ix
Peerless Manfg. Co., Louisville, Ky. xi
Prosser, Thos. & Sons, N. Y. xviii

Oils:
Galena Oil Works (Limited), Franklin, Pa. vi
Signal Oil Works, Franklin, Pa. (cover) 1
Stuart, D. A. & Co., Chicago, Ill. viii

Oil-Box Covers:
Vulcanized Fibre Co., Wilmington, Del. (cover) 3

Paints:
Devoe, F. W. & Co., New York, N. Y. x
Iron Clad Paint Co., Cleveland, O. viii
Lowe's Metallic Paint Co., Chattanooga, Tenn. ix
Pflug Platin Paint, L. W. Morris & Son, New York, N. Y. xvi
Sherwin, Williams & Co., Cleveland, O. xi
Raynolds, C. T. & Co., New York, N. Y. xiv

Pig Iron:
Detroit Iron Furnace Co., Detroit, Mich. vii

Platform and Couplings:
Cowell Platform & Coupling Co., Cleveland, O. xiv

Portable Drills:
Stow Flex. Shaft Co. (limited), Phila., Pa. xviii

Power Hammers:
Forsaith, S. C., Mach. Co., Manchester, N. H. xxii
Long & Allstatter Co., Hamilton, O. viii

Power Punches, Shears and Hammers:
The Long & Allstatter Co., Hamilton, O. viii

Publications:
Wiley, John & Sons, New York, N. Y. i

Railways:
C., C., C. & I. R. R. vii

Railway Supplies:
Adams & Westlake, Chicago, Ill. xviii
Ellis, W. R., New York and Boston (cover) 4
McCoy & Sanders, New York, N. Y. vi
Pittsburgh Supply Co., Pittsburgh, Pa. vi
Post & Co., Cincinnati, Ohio xxii
Union Brass Works, Chicago, Ill. xviii
Williamson & Cassedy, Philadelphia, Pa. xxii

Railway Equipment:
Patten, Jas. T., New York, N. Y. xi

Railway Fastenings:
Sellers, Morris & Co., Chicago, Ill. xviii

Refrigerator Cars:
Tiffany Refrigerator Car Co., Chicago, Ill. vi

Rivets:
Standard Rivet Co., Cleveland, Ohio (cover) 3

Roofing:
Bodine Roofing Co., Mansfield, Ohio. vi
Cincinnati Corrugating Co., Cincinnati, O. (cover) 2
Van Noorden & Co., E., Boston, Mass. ix

Safety Valves:
Ashton Valve Co., Boston, Mass. xiii
Consolidated Safety Valve Co., N. Y. xi
Crosby Steam Gauge & Valve Co., Boston, Mass. xiii
Dwight, George, Springfield, Mass. ii

Shade Rollers:
Hartshorn, Stewart, New York, N. Y. x

Sheet-Iron:
Wood, W. D. & Co. (Limited), Pittsburgh, Pa. xiii

Signals:
Ry. Cab Elect. Signal Co., New York, N. Y. xx
Union Switch & Signal Co., Pittsb'gh, Pa. (cover) 1

Skylights:
Van Noorden & Co., E., Boston, Mass. ix

Stay-Bolt Iron:
Lang, W. Bailey, New York, N. Y. xxii

Steam Snow Shovel:
Rotary Steam Snow Shovel Mfg. Co., Paterson, N. J. xi

Steel:
Chrome Steel Works, Brooklyn, N. Y. (cover) 1
Midvale Steel Co., Philadelphia, Pa. iii
Standard Steel Works, Philadelphia, Pa. vii

Steel Castings:
Chester Steel Castings Co., Phila., Pa. iii
Eureka Cast-Steel Co., Philadelphia, Pa. xxii

Steel Tires:
Midvale Steel Co., Philadelphia, Pa. iii
Standard Steel Works, Philadelphia, Pa. iii

Switch Stands:
Union Switch & Signal Co., Pittsburgh, Pa. (cover) 1

Switches:
Union Switch & Signal Co., Pittsburgh, Pa. (cover) 1

Tackle Blocks, Trucks and Baggage Barrows:
Penfield Block Co., Lockport, N. Y. ix

Trucks:
Automatic Truck Works, Midland Park, N.J.

Twist Drills:
Cleveland Twist Drill Co., Cleveland, O. xvi
Morse Twist Drill and Machine Co., New Bedford, Mass. ii

Varnishes:
Babcock, John & Co., Boston, Mass. x
Berry Brothers, Detroit, Mich. xiv
Bigelow, Moses & Co., Newark, N. J. x
Brooks, Clarence & Co., New York (covers) 1 & 4
Devoe, F. W. & Co., New York, N. Y. x
Murphy & Co., New York, N. Y. x
Parrott Varnish Co., Bridgeport, Conn. (cover) 4
Poillon & Staples, New York, N. Y. (cover) 4
Raynolds, C. T. & Co., New York, N. Y. xiv
Shipman & Bolen, Newark, N. J. xi
Smith, Edw. & Co., New York, N. Y. x
Stimson & Co., Boston, Mass. (cover) 2
Thresher & Co., Dayton, Ohio (cover) 1
Thursby, Geo. R. & Co., New York, N. Y. i
Valentine & Co., New York, N. Y. x

Ventilators:
McGovern & Willson, Detroit, Mich. vii
Standard Car Heating & Ven. Co., Pitts., Pa. vi
Van Noorden & Co., E., Boston, Mass. ix

Vises:
Massey, T. C., Chicago, Ill. (cover) 2

Weather Strips:
Pat. Met. Weather Strip Co., New York. (cover) 1

Wire Nails:
American Wire Nail Co., Covington, Ky. xviii

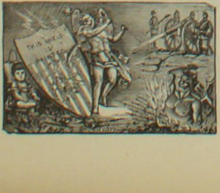
White Lead:
Lewis, J. T. & Bros., Philadelphia, Pa. vi

Wood-Working Machinery:
The Egan Co., Cincinnati, O. xiii
Fay, J. A. & Co., Cincinnati, O. xx
Forsaith, S. C., Mach. Co., Manchester, N. H. xiii
Goodell & Waters, Philadelphia, Pa. xx
Rogers, C. B. & Co., Norwich, Conn. xii
Schenck Mach. Works, Matteawan, N. Y. (cover) 2
White, R. T., Boston, Mass. viii

Wrecking Cars:
Harrison, Loring vi
Industrial Works, Bay City, Mich. xviii

PENFIELD BLOCK CO.
Pulley Blocks and Iron Sheaves.
Phosphor-Bronze Self-Lub. Sheaves
Pushers, Giant Car, $5.00 each.
Poor's Manual, 1880-81 and 82.
See p. 53.
Please write for lists, prices, etc.
LOCKPORT, N. Y.

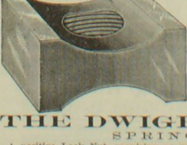
LOWE'S METALLIC PAINT CO.,
CHATTANOOGA, TENNESSEE.
XENOPHON WHEELER, Prest. GEO. M. CHAPMAN, Treas. and Manager.
Original Manufacturers of the Well Known



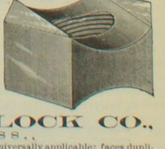
DRY METALLIC PAINT
From Red Fossiliferous Iron Ore.
SUPERIOR IN PURITY AND STRENGTH, UNEQUALED IN UNIFORMITY OF COLOR AND IN FINISH, AND REQUIRING TWENTY-FIVE PER CENT. LESS OIL THAN ANY OTHER PAINT.

The Paint for Factories, Cars, Bridges, Roofing, and all Structures and Materials Exposed to the Weather.

WRITE FOR QUOTATIONS.



THE
"NEW" NUT,
MANUFACTURED BY



THE DWIGHT NUT LOCK CO.,
SPRINGFIELD, MASS.,

A positive Lock Nut, requiring no washer or second nut; simple, universally applicable; faces duplicates, precluding mistake in application; applied, removed and used the same as any nut. The direction of the concavities is *across* the fibre of the steel, and the strength of nut equals the initial strength of the bolt. This nut is made of STEEL possessing a tensile strength of 60,000 pounds. It is cold-pressed and is the first **STEEL NUT** offered to the public.

F. W. DEVOE & CO.,
Cor. Fulton and William Sts., New York,

COFFIN, DEVOE & CO.,
176 Randolph Street, Chicago,

MANUFACTURERS OF

DRY COLORS, COACH AND CAR COLORS IN OIL AND JAPAN.

Special Colors Compounded to Match any Desired Shade.

FINE RAILWAY VARNISHES AND JAPANS FOR PASSENGER COACHES.

Also Freight Car, Caboose and Bridge Paints Ready for Use. Fine Brushes for Railroad Car and Coach Painting. All Kinds of Painters' Supplies and Artists' Materials. Mixed Paints—A Large Assortment of Desirable Shades for Inside and Outside Work.

MANUFACTURERS OF RAILWAY CAR VARNISHES. **JOHN BABCOCK & Co** NO. 2 LIBERTY SQUARE BOSTON, MASS.

The MURPHY VARNISHES M and A V B·C System

GEO. R. MENEELY, T. W. GETMAN, } West Troy, N. Y.

GEO. R. MENEELY & CO.,
WEST TROY, N. Y., AND ATLANTA, GA.,

A. B. BOSTICK, Supt., Atlanta Brass Foundry.

MASTER CAR BUILDERS' STANDARD.

MANUFACTURERS OF

HOPKINS' PATENT SELF-FITTING JOURNAL BEARINGS
FOR RAILWAY CARS AND ENGINES.

These bearings were awarded the **only** premium, a silver medal, at the National Exposition of Railway Appliances at Chicago in June, 1883. Patent pronounced valid by both Eastern and Western Railway Association. Bearings made of any required pattern, of different qualities of bronze, **BORED** out, and finished with Hopkins' Patent Self-fitting Lining, which **speedily fits itself to any journal, new or old,** effectually obviating heating, and increasing the service more than 50 per cent. over unlined brasses. The most **reliable** and economical bearings in use. Adopted by the principal Railroads of the country for passenger and freight service. Old bearings taken in exchange. No charge for pattern making, packing or delivery. Price and Pattern Lists (of over 800 patterns) furnished upon application.

TRADE **VALENTINES VARNISHES** MARK.

FINE COACH AND RAILWAY VARNISHES,
MANUFACTURED BY
NEW YORK, CHICAGO, **VALENTINE & COMPANY,** BOSTON, PARIS.

RAILWAY VARNISHES. **MOSES BIGELOW & CO** EST. 1845 NEWARK, N.J.

ESTABLISHED 1827.
RAILWAY VARNISHES, **EDWARD SMITH & CO.,** RAILWAY COLORS.
158 WILLIAM ST., NEW YORK.

HARTSHORN'S SELF-ACTING SHADE ROLLERS

Are made specially for Railroad Cars, and are supplied with brackets to fit all kinds of windows. No Cords or Balance Used by all the principal Parlor and Sleeping Car Companies.

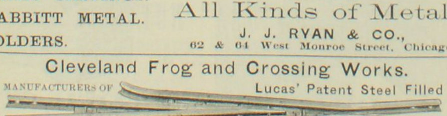
STEWART HARTSHORN,
486 Broadway, - - New York City.

Railroad Journal Bearings
BRASS CASTINGS.
BABBITT METAL.
SOLDERS.

DEALERS IN
All Kinds of Metals.
J. J. RYAN & CO.,
62 & 64 West Monroe Street, Chicago

Cleveland Frog and Crossing Works.

MANUFACTURERS OF Lucas' Patent Steel Filled



Frogs and Crossings,

Also of all kinds of Split Switches, Switch Stands, Tie Bars and Track Supplies in General.
GEO. C. LUCAS, Supt. **BOWLER & CO., 14 Winter Street, Cleveland, O.**

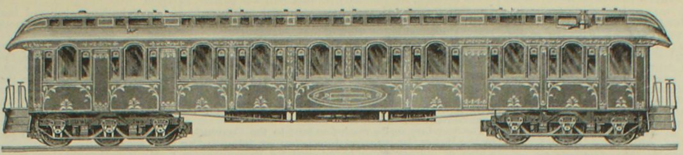
Boiler, Locomotive AND Smoke Stack STEELS. Quality Unsurpassed. Plates up to 100 inches in width.

FIRE BOX STEEL.

Purity, Ductility and Softness.

SHOENBERGER & CO.,
PITTSBURGH, PA.

THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XVI.
NUMBER 7.

JULY, 1885.

SINGLE NUMBERS, TEN CENTS.
$1.00 PER ANNUM.

Miscellaneous Items.

THE Manhattan Railroad Company are building some flat dump cars entirely of iron, for carrying ashes. The body of the car is made from No. 10 sheet iron stiffened with angle irons.

THE Wason Manufacturing Company, at Springfield, Mass., have recently built eight very handsome drawing-room cars for this road, which are now in service on the through Canadian traffic.

THE Taunton Locomotive Works have changed the exhaust pipes of the engines they build with extended smoke boxes, so that one is behind the other instead of being set side by side. By this means less obstruction is offered to the gases passing from the tubes toward the smoke stack.

THE officers elected by the Railway Master Mechanics' Association at its recent convention at Washington, D. C., are: President, J. Davis Barnett, Grand Trunk Railway; 1st Vice-President, Wm. Woodcock, Philadelphia & Reading; 2d Vice-President, Jacob Johann, late of Wabash, St. Louis & Pacific; Treasurer, George Richards, Boston & Providence; Secretary, J. H. Setchel, Brooks Locomotive Works.

AN excursion party that traveled in a novel fashion recently visited the Eastern states from California. They hired an ordinary car for the trip at third class rates, and fitted it up as a sleeping car with cooking attachment. A piano was got into one corner, and numerous ingenious arrangements were made for the convenience and comfort of the party. That style of travel was unanimously declared, by those most interested, a decided success, and the trip was made at comparatively small cost.

A MASSIVE ditching machine has been constructed at the Burlington & Missouri shops at Plattsmouth. An ordinary platform car is supplied with a frame reaching out several feet on each side, from which are suspended four scoops or buckets, one opposite each corner of the car. These are constructed of boiler iron, and are large enough to scoop up a cubic yard of earth each. These are so attached that they will dig into the ground and remove a cubic yard of earth each, and can then be raised, lowered, or up-ended to allow the contents to fall out.

A CURIOSITY in the shape of an invention intended to improve the valve motion is to be seen in a small wooden model that has been left in the office of Mr. Colby, Master Mechanic of the Boston & Albany Railroad, at Boston The object attained by the inventor is to do away with one eccentric on a reversing engine, but his plan entails the using of a square driving axle, which he appeared to think was a trifling matter. The position of the single eccentric is changed on the shaft by means of a wedge. The idea was worked out years ago in the Dodds motion.

IN the course of a recent address at Auckland, New Zealand, Sir Julius Vogel said in strong terms that the free trade and free competition are leading British merchants to sell exceedingly inferior merchandise to the colonists. He mentioned a case where a car axle broke in two simply by falling a short distance while being unloaded. It seems to us the Australasian colonists do not subject the axles they buy for their railroad cars to the severe preliminary tests made by American railroad companies. A rigid test is the proper way to discourage the manufacture of inferior axles.

IN the beginning of last winter, a question was raised at the car shops of the Boston & Providence Railroad, about the likelihood of the salt-saturated liquid used in the car-heating pipes freezing up, if the fire was permitted to go out in cold weather. To make a practical test of the matter, Mr. Thayer, the chief clerk of the mechanical department, filled a bottle with the liquid and put it outside where it was exposed to the inclemency of the weather, but still was convenient for examination. At one time the thermometer registered 16 degrees below zero, but the liquid showed no indication of congealing.

LOCOMOTIVE building is extremely depressed in the New England shops at present. The Hinkley Locomotive Works, Boston, have got three of their standard eight-wheel engines on the floor, but they are being made merely for stock and to keep the leading men together. The Taunton Locomotive Works, and the Mason Locomotive Works, at Taunton, are doing little more than what keeps their leading workmen employed. The former shop has some printing machines that require a great deal of work in course of construction, and the latter works have considerable cotton machinery under way.

A SOMEWHAT singular case of an old appliance being reinvented in perfect good faith, and patented, is mentioned in the annual report of the Eastern Railroad Association. Mr. George Richards, Master Mechanic of the Boston & Providence Railroad, received in 1874 a patent on improvement in perches for dumping cars. The device was new, so far as any recorded evidence showed to the contrary; but when the Eastern Railroad Company some time afterward ordered some cars with the improved perches to be made at the Portland Locomotive Works, it was found that cars having perches practically of the same kind had been made for the Panama Railroad Company years before Mr. Richards brought out his invention.

IT is a no less fatal error to despise labor, when regulated by intellect, than to value it for its own sake. We are always in these days trying to separate the two; we want one man to be always thinking and another to be always working, and we call one a gentleman and the other an operative; whereas the workman ought often to be thinking and the thinker often to be working, and both should be gentlemen in the best sense. As it is, we make both ungentle, the one envying, the other despising his brother, and the mass of society is made up of morbid thinkers and miserable workers. Now, it is only by labor that thought can be made happy; and the professions should be liberal, and there should be less pride felt in peculiarity of employment and more in excellence of achievement.—*Ruskin.*

MR. C. W. SMITH, General Manager of the Chesapeake & Ohio Railway, has addressed to the United States Tube Rolling Stock Co. the following statement of the performance on his road of tubular car No. 484, built by said company: While the car has carried many light loads, it shows a record of having carried the following heavy loads, namely: May 5, 61,000 lbs.; May 9, 59,600 lbs.; May 12, 69,100 lbs.; and on May 15, 80,800 lbs.; being an average of 67,650 lbs., the loading being iron ore. Owing to the shallowness of the car box, it could not be loaded with any other commodity equal to its capacity. Mr. Smith also says that the car is in good condition in spite of the extraordinary strain to which it has been subjected, and that it shows no signs of weakness either in body or trucks.

MR. JAMES H. RUTTER, President of the New York Central & Hudson River Railroad Co., died at his home in Irvington, N. Y., June 12, aged 49 years. He was formerly Assistant General Freight Agent of the Erie Railway, and in 1872 became General Freight Agent of the New York Central road, in which capacity he displayed such marked ability and rendered such acceptable service that he was promoted by Mr. Vanderbilt to the positions of General Traffic Manager and Vice-President. Upon the retirement of Mr. Vanderbilt, and the general reorganization which followed, Mr. Rutter became President of the road by the unanimous choice of the directors. He had been suffering from ill health for several years, but not so as to incapacitate him, except at intervals, for attending to business.

THE Westinghouse Air Brake Company have recently equipped 150 freight cars for the new short route to Norfolk, Va., with their automatic brake. The cars will be used for handling the increased fruit and vegetable traffic expected by the Pennsylvania Railroad from the district newly opened up. In experiments made connected with the equipment of brakes put on these trains, it was found that the automatic air brake worked a train of 75 cars successfully. In applying the brake to such a long train, the engineer has to exercise care to prevent the reaction of the air from releasing the brakes at the front end of the train. To provide against this result, in the hands of careless or incompetent men, the Westinghouse Air Brake Company are preparing to apply a new regulator, which has recently been invented by Mr. George Westinghouse. The company have recently contracted to put air brakes on a number of freight cars belonging to the St. Louis & San Francisco road.

AT the car-shops of the Boston & Albany Railroad, at Allston, Mr. Adams is changing the internal arrangement of several drawing-room cars. The toilet rooms and heating apparatus were originally in the middle of the car, which was found inconvenient and extravagant of room, and they are now being placed at the ends. The inside of the car is finished with mahogany. Two chair cars are being cleaned and varnished. Several old passenger cars that got antiquated, are being rejuvenated into baggage cars, and an old sleeping-car is undergoing changes that will make it an ordinary passenger car. This car will look as good as new when ready for service. It has a plain walnut finish. A good deal of extra work is being done in these shops putting on the Ames draw-bar to freight cars, and getting the draw-bar ready. They are making axles 4¼ inches diameter for 42-inch wheels to replace axles 3⅞ that have been found too light. They are putting the Pratt door on some freight cars and the Marden brake beam on passenger cars.

THE Western method of putting grab handles on caboose cars is well worth imitating in other parts of the country. The handle on the outside of the car next the platform starts at the usual place, but instead of being carried down in a straight line is curved so as to form nearly a quarter of a circle on the side of the car, with the last 10 or 12 inches straight and horizontal. The reason for this peculiar shape is not apparent at the first glance, but examination shows that the principal is a correct one. In getting upon a car in motion, a man first wants a support to lift himself from the ground, and then a hold of some kind to enable him to place his foot upon the step. The horizontal portion gives a support of exactly the desired kind, enabling a man to carry his weight with ease and certainty. The vertical portion on the corner-post prevents the body from swinging backward as soon as the motion of the car is felt, when the feet leave the ground and the weight comes upon the hands. The aid to be derived from such a position of the hand-rail will be appreciated by any one who has occasion to get upon a rapidly moving car.

FROM Brainerd, Minn., we learn that the Nathan Manufacturing Company have been equipping a number of Northern Pacific Railroad locomotives with their sight-feeding oil cups for valves and cylinders. The engineers running the engines speak very highly of the improved efficiency of the locomotives, from getting oil fed continuously to the hot rubbing surfaces. A case that strongly illustrated the advantage of having the valves oiled continuously happened recently on the Chicago & Northwestern Railway. They have a class of ten-wheel engines doing freight service on a portion of that road where there is a long, heavy grade. The engines have long eccentric rods that span the forward axle by means of an offset. The engines had plain unbalanced valves. In climbing the long grade without the means of oiling, the valves sometimes got dry, and required so much power to move them that in several instances the eccentric rods got straightened out. As a means of preventing this trouble, automatic oil cups were put on, and their action so improved the working of the engines that they now take two more cars up the grade, besides having no tendency to straighten out the eccentric rods.

DURING the course of a recent conversation with Mr. E. M. Reed, vice-president and general superintendent of the New York, New Haven & Hartford Railroad, we learned that he applied the extended smoke box to locomotives as early as 1863. Mr. Reed was at that time master mechanic of the road, and he made the change in expectation that the use of an open stack would admit a free draft that would make large nozzles admissible. He thinks that most of the failures to make the extended front work more economically than an obstructed stack have resulted from the smoke box not being kept air-tight. Misunderstanding the proper function of the diaphragm, and constructing it badly or setting it in the wrong position, have also led to the failure of the extended front in the days when it was on trial. It is getting so popular now that the cause of the trouble is diligently searched for when the device does not work satisfactorily, and a remedy is invariably found. For many years the remedy was to cut off the extension and put on a diamond stack to obstruct the draft. Mr. Reed never wavered in his belief that something like the extended front end was to be the future method of preventing spark-throwing in American locomotives, and he kept putting on that device when it had few friends and many active enemies.

The Master Car-Builders' Association.

NINETEENTH ANNUAL CONVENTION.

The nineteenth annual convention of the Association was held at the Hygeia Hotel, Old Point Comfort, Va., on Tuesday, June 9. There were 94 members present, including a very full attendance of representative members.

The convention was called to order by the President, Mr. Leander Garey, who delivered his annual address, in which he alluded to the existing depression in railroad business, which, in his judgment, made it specially incumbent upon the members of the Association to manage the business of constructing and maintaining cars so that the expense would be as low as possible. He thought it would be a good plan to establish a clearing-house system that would deal with cars running over foreign roads. It was desirable that standards for cars and parts of cars should be adopted, but the forms should first be thoroughly discussed. Car couplers should receive immediate attention. So many people are killed annually coupling cars, that the legislatures of various States are making the adoption of certain forms of automatic couplers compulsory with railroads. He thought that the action of the Association ought to be such as would prevent further necessity for legislative enactment.

MEMBERS IN ATTENDANCE.

Adams, F. D	Boston & Albany.
Armbruster, Jos	E. Tenn., Va. & Ga.
Barr, J. N	Chicago, Milwaukee & St. Paul.
Bissell, T. A	Barney & Smith M'f'g Co.
Blackall, R. C	Delaware & Hudson Canal Co.
Blackwell, Chas	Norfolk & Western.
Bradley, Osgood	Bradley Car Works.
Brady, J. B	New York Central.
Bray, F. D	Lake Shore & Mich. Southern.
Briggs, R. H	Ches., Ohio & So. Western.
Bryan, H. S	Chicago & Iowa.
Bushnell, R. W	Bur., C. Rapids & Northern.
Bosdevex, E. F	Pennsylvania.
Canham, H	Central Vermont.
Chamberlain, J. T	Boston & Albany.
Chamberlain, W. E	Providence & Worcester.
Cloud, J. W	Pennsylvania.
Cooper, H. L	Lake Erie & Western.
Coulter, J. P	Ohio & Mississippi.
Davenport, W. R	Erie Car Works.
Day, W. H	Wil., Col. & Augusta.
Demarest, G. W	Northern Central.
Duncan, T. G	Cin., Wash. & Balt.
Ellis, E. W	Swift Refrigerator Car Co.
Ennis, W. C	N. York, Susq. & Western.
Ensign, S. P	Ensign Mf'g Co.
Finlay, L	Hot Springs R. R.
Fletcher, J. B	National Car Co.
Ford, M. P	Pitts., Cin. & St. Louis.
Forney, M. N	*Secretary.*
Forsyth, Wm	Chicago, Bur. & Quincy.
Fuller, Wm	New York, Penn. & Ohio.
Galloway, Alex	Cleveland & Marietta.
Garey, L	*President.*
Gause, J. T	Harlan & Hollingsworth Co.
Goodwin, H. S	Lehigh Valley.
Gore, C. E	Lafayette Car Works.
Gramling, G. H	South Carolina.
Grieves, E. W	Baltimore & Ohio.
Hackett, Geo	Phila. & Reading.
Haines, S. W	Pittsburgh & Lake Erie.
Harrison, W. H	Baltimore & Ohio.
Haupt, S. B	Norfolk & Western.
Hill, J. B	Manhattan Elevated.
Hitchcock, R	Connecticut River.
Hodge, John	Missouri Pacific.
Hopkins, D. A	Manufacturer.
Hunter, D. W	Providence & Worcester.
Irvin, Samuel	Missouri Pacific.
Jackson, J. H	Jackson & Sharp Co.
Keeler, Sanford	Flint & Pere Marquette.
Keith, I. N	Keith M'f'g Co.
Kelley, J. N	Alabama & G. Southern.
Kinyon, Wm	Western & Atlantic.
Kirby, John	Lake Shore & Mich. Southern.
Leighton, J. T	Jackson & Sharp Co.
Lentz, J. S	Lehigh Valley.
Levan, J. P	Pennsylvania.
Lightner, J	Boston & Providence.
McCarty, H	Philadelphia & Erie.
McCuen, J. G	Mexican Central.
McDevitt, R	Chicago West Division.
McIlwain, J. D	Grand Trunk.
Mackenzie, John	New York, Chicago & St. Louis.
Marden, J. W	Fitchburg.
Mileham, J. N	New York, L. Erie & Western.
Miller, Robert	Michigan Central.
Mills, C. W	Rochester & Pittsburgh.
Mosier, J. W	Louisville & Nashville.
Nelson, E. D	Pennsylvania.
Pendleton, M. M	Seaboard & Roanoke.
Perry, H. M	Flint & Pere Marquette.
Potts, Robert	Michigan Central.
Pratt, E. E	New York & New England.
Rhodes, G. W	Chicago, Bur. & Quincy.
Richardson, D. C	Boston & Maine.
Richardson, John	Cin., New Orleans & Tex. Pacific.
Sargent, Geo. M	Chicago, St. Louis & Western.
Schlacks, H	Illinois Central.
Shoemaker, S. B	Swisvale Car Co.
Smith, C. A	Union Tank Line.
Snow, W. B	Illinois Central.
Soule, R. H	New York, West Shore & Buffalo.
Townsend, Joseph	Chicago & Alton.
Trainham, W. H	Rich., Fred. & Potomac.
Turreff, W. F	Cleve., Col., Cin. & Ind.
Verbryck, B. K	Chicago & Rock Island.
Voorhees, John	Indianapolis Car Co.
Wagner, J. L	Dispatch Line.
Wall, E. B	Pennsylvania.
Wallis, J. M	Phil., Wil. & Baltimore.
Watrous, G. C	Detroit, Lansing & Northern.
Webster, H. A	Manhattan Elevated.
Whitney, H. A	Intercolonial.
Whitworth, J. S	Norfolk Southern.
Wiers, J. H. F	Paige Car Wheel Co.
Wilder, F. M	New York, Lake Erie & Western.
Wilson, E. D	Philadelphia & Erie.
Wood, Joseph	Pennsylvania Co.

Mr. M. N. Forney, Secretary, then read his report, which stated that the active membership was: Convention of 1883, 136; convention of 1884, 130 (17 members having been dropped for non-payment of dues); convention of 1885, 132, 15 new members having been added during the year previously to the convention, as well as a number subsequent to the above summary at the convention itself, as already stated.

The representative membership was:

	No. members.	Cars.
1883	54	357,030
1884	66	439,305
1885	71	(about) 465,000

This also does not include some who joined at the convention itself, but only those who joined previously.

One associate member has resigned, and there is now only one, the secretary, on the list.

The increase, the Secretary pointed out, was greater in fact than it appeared, as all nearly nominal members had been dropped, and those on the list almost all took an active personal interest in the work of the association.

The Executive Committe recommended that dues for the ensuing year be $5, as heretofore.

Messrs. H. Stanley Goodwin, Robert Miller, G. W. Rhodes, F. M. Wilder and R. McKenna were then appointed a nominating committee for officers for the ensusuing year, and Messrs. Snow, Hitchcock and Findley were appointed a committe for selecting a place for the next convention.

The Secretary read a resolution sent to the Convention by the Master Car-Painters' Association, as follows: Can a plan of outside finish be adopted for passenger cars, whereby the painting may be done up to the finishing color coats before the wood finish is put on the body and without injury to the preparatory coats of paint?

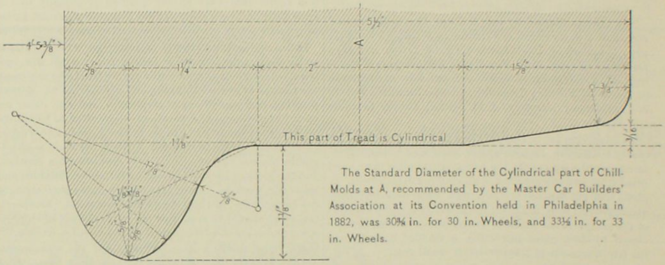
REPORT ON A STANDARD FORM FOR THE TREADS AND FLANGES OF WHEELS.

The Committee to whom the above subject was referred, recommend the adoption by the Master Car-Builders' Association of the form of tread and flange shown in the following engraving, as a standard for the treads and flanges of cast-iron and steel-tired wheels.

The Committee also recommend that in fitting wheels on axles, the standard distance between the backs of the flanges should be 4 feet 5⅜ inches, but that a variation be allowed from this dimension of ⅛ inch each way, making the maximum distance 4 feet 5½ inches, and the minimum distance 4 feet 5¼ inches.

The Committee further agreed that the adoption of a limit gauge, by which it should be determined whether cars shall be received or not in the interchange of traffic, does not come under the jurisdiction of the Master Car-Builders' Association, but should be acted on by the organization which has adopted and annnally revises the rules governing the condition of and repairs to freight cars for the interchange of traffic.

H. Stanley Goodwin,
M. N. Forney,
R. C. Blackall,
John W. Cloud,
Herbert Wallis,
} Committee.



The Standard Diameter of the Cylindrical part of Chill-Molds at A, recommended by the Master Car Builders' Association at its Convention held in Philadelphia in 1882, was 30¾ in. for 30 in. Wheels, and 33½ in. for 33 in. Wheels.

Mr. Forney explained that although he signed the report, he did not quite agree with the radius of the flange fillet. He preferred ½ inch to ⅜ inch.

Mr. H. S. Goodwin said that all the other members of the committee agreed on ⅜ inch.

Mr. F. M. Wilder wished to know if the members of the committee had experimented with the form of tread recommended, to make them prefer it.

Mr. J. N. Barr had at one time experimented with cylindrical wheels to find out their value, and he found that about 80 per cent. of them were removed for sharp flanges.

Mr. W. H. Day asked if the object of chamfering off part of the tread was to obviate cutting flanges?

Mr. Goodwin explained that the object of the chamfer was to cut down the outside of the tread not subject to wear, so that the tire would not need turning down so readily.

Mr. Blackall understood that the wheel recommended was a compromise between the coned wheel and the straight tread. He was in favor of a coned wheel.

Mr. Goodwin said he had used wheels with a cylindrical tread since 1880, and they had run very satisfactorily. Mr. Partridge, from an important railroad publication, the National Car Builder, had come to their shops some time ago, and investigated the subject of their wheel mileage. The result as published in the paper showed that only three per cent. of their wheels had been removed for sharp flanges.

Mr. Lobdell, speaking as a wheel-maker, said they did not want to alter their form of chills and have to throw them away in a short time owing to the form of tread proving unsuitable. This form of tread is not new. It was patented as early as 1833, and was used for about ten years, but was not found satisfactory and was changed for a cylindrical tread. He did not think sharp flanges were due so much to the form or tread as to bad selection of wheels of different degrees of hardness on the same axle. Cylindrical wheels were used for years and ran satisfactorily till certain railroad engineers began to call for coned wheels. The change was made, but he did not see that coning saved flanges from wearing. He thought ½ inch was enough for radius of flange fillet, but contended that the flange should be 1¼ inch thick, because that gave more wear. He believed the flange might be improved by not giving it so much flare.

Mr. Goodwin explained that the dimensions selected were a compromise of individual preferences, which they thought would be agreed upon by the greater part of the members.

Mr. Wilder expressed the belief that more had been made out of sharp flanges than facts warranted. He did not think it was necessary to consider the shape of the flange, tread or rail as affecting the expense of operating.

Mr. Day contended that the form of rail-head should be as much considered as the shape of wheel, and that rail-makers ought to pay greater attention to the matter. He had no trouble with chilled wheels cutting flanges, as not more than 2 per cent. were removed for that cause. But with steel-tired wheels his experience had been different, for they gave much trouble from sharp flanges. They have more trouble with flattening than with flange cutting of wheels. They do not get more than 30,000 miles average out of wheels before they have flat spots.

Mr. John Kirby believed that the principal cause for flanges getting sharp was through one wheel being softer than the other. Difference of circumference will also produce sharp flanges. Improved means of measuring size of wheels tended to decrease the trouble. He put a set of 36-inch wheels under a car and found that two of the wheels were wearing their flanges. He found that the wheels cutting their flanges were softer than the others, so he changed them and put the soft wheels together, after which he had no more trouble.

Mr. J. Townsend wanted to know what made two wheels on one axle have sharp flanges. He had seen wheels in that condition.

Mr. Barr thought there were very few wheels removed with both flanges cut. Where a flange is worn on one wheel, it is generally found that the other wheel is worn hollow some distance away from the flange. It seemed to be caused by one tread being softer than the other. He was of the opinion that a wheel with one-inch flange would wear better than a wheel with flange 1½ inch. He thought more information was needed on the subject before a decision was made. The further the flange was got into the sand in casting the better was the chill.

Mr. Blackall said that wheels very much like those recommended in the report had given the best of satisfaction on his road.

Mr. W. F. Turreff testified to this form of tread giving good results on his road.

Mr. J. W. Cloud agreed to this form of tread because he thought it desirable to be unanimous. A desire seemed to exist to have some taper to the tread, and he thought it desirable to have the sense of the Master Car-Builders before the question was put to letter ballot. Getting the exact opinions may facilitate the means of arriving at a decision, and lead the letter ballot to result in favor of the form recommended.

Mr. G. W. Rhodes had made some experiments some years ago with different forms of wheels, and they found the coned wheel did better than the flat wheel. He believed the coned wheel had a better bearing on the rail when going around curves.

Mr. Lobdell wanted it to be remembered that cars have to go on all roads, and the question is, will they keep on the track on bad roads? He knew of the case of a Southern road where they refused the cars having this form of wheel, because they believed it tended to derailment. He thought the chamfered part was likely to lead the other wheel to climb the rail.

Mr. K. A. Blackwell mentioned a case where cars with this form of wheel were refused by a road because they had the reputation of climbing the rail. An investigation was instituted, and it was found that the real cause of the trouble was bad construction of trucks.

Mr. F. D. Adams favored this form of wheel. His road had devoted great attention to the wheel question, and in trying to get wheels of uniform size, they requested their wheel-makers three years ago to supply them with wheels similar to the form proposed by the committee. They had been using these wheels ever since, and no objection could be found against them. He would not object to giving wheel treads 1/16 inch cone if that would bring about an agreement. He thought flanges were often cut by trucks getting out of square and by cars being improperly loaded.

The meeting was adjourned at this time, and other business intervened, so that the subject remained unfinished till two days later, when

Mr. Goodwin moved that the report be adopted and put to letter ballot.

Mr. Davenport said that many of the members could not accept the tread proposed. Many believed that coning was necessary, and he wished to move as an amendment that the form of tread shown on figure 56 of last year's annual report be also adopted to give the members a choice of a coned tread.

Mr. Forney opposed the amendment, and it was finally ruled out of order. He said that two years ago a committee reported on wheel treads. One recommended was coned, the other cylindrical. Both were defeated. Owing to this he proposed in his paper, read before them last year, to meet the objections of both sides. While the tread now proposed is cylindrical, he contended that it has the essential point of the coned wheel. He thought the adoption of this form would reconcile contending views, and that coming to an agreement was of great importance.

Mr. Goodwin thought the flange radius of ⅜ inch a good compromise, since some wanted greater and some less. The Lehigh Valley and other roads were using rails with a head formed to fit this radius.

Mr. Cloud thought the tread should be sent to letter ballot as it stands.

Mr. Forsyth moved that the recommendations of the committee be sent to letter ballot. Carried.

REPORT OF THE COMMITTEE ON STANDARD FREIGHT TRUCKS.

The previous reports and discussions on this subject are found in the printed proceedings of the Association, as follows:

Niagara meeting, 1882, page 54.
Chicago meeting, 1883, page 79.
Saratoga meeting, 1884, pages 36, 102, 108.

The discussions of our previous reports have resulted in instructions, as follows:

1. The truck shall be designed for a car of 40,000 pounds capacity.

2. It shall be of the diamond type, with cross channels, so that it may be used with a swinging bolster or a rigid one.
3. The wheel base shall be 5 ft.
4. The centers of arch-bars shall be spread laterally 6 ft. 3 in., as required by the standard axle.
5. The distance between centers of bolts through journal boxes shall be 8 in., as fixed by the standard journal box.

We have designed a truck in accordance with these instructions, and the plan is submitted for your approval.

The drawing is sufficiently detailed to secure uniformity in the construction of the wrought-iron frame and cross channels.

The smaller details have not been worked out, because that can be done best after the general plan has been discussed and approved, and some of the trucks are built.

The side frame-bars are 3½ in. wide, the arch-bar 1⅛ in. thick, the inverted arch-bar 1 in. thick, and the pedestal tie-bar ½ in. thick.

The frame-bolts are 1⅛ in. diameter, with a load of 10,000 lbs. on each journal; the stress per square inch on the arch-bar is 4,000 lbs., in the inverted arch-bar 5,300 lbs., in the bolts through channels 5,700 lbs., and the shearing in the bolts through the journal boxes is 5,000.

In the channel-bar at the point of greatest bending moment the unit stress is 7,800 lbs.

In the trussed bolster, assuming a stress of 10,000 lbs. per square inch in the truss rods, that in the oak is 2,400 lbs. In the rigid bolster the stress in the oak is 1,950 lbs. per square inch. The unit stress on the swing hanger is 4,500 lbs., and the shearing stress in the swing hanger shaft is 4,500 lbs.

The figures show an ample margin for safety in the proportions of the proposed truck.

The standard journal box will have the bolt holes enlarged for 1⅛-in. bolts, and a proper thickness of metal around the holes, extending slightly into the box. The truck is arranged for convenient application of automatic train brakes, and for the suspension of the brake beam between the wheels and from the truck frame.

The brake beam and shoe form the subject of another committee, but our plan will admit of almost any form they may recommend.

A number of trucks should be built from the plans presented; the best form for the details will then be determined, and we trust that a final plan and details may be prepared and adopted at the next meeting.

Robert Miller,
J. A. Barr,
William Forsyth,
Jos. Wood,
Wm. McWood,
H. S. Bryan,
} Committee.

The above report having been read by Mr. Miller, chairman of the committee, the discussion was opened by Mr. Goodwin, who understood that no trucks of the design recommended by the committee had yet been built, consequently there was nothing to show how they would stand service. He wished the members to examine the truck belonging to the Lehigh Valley Railroad, to be seen under cars at Newport News. A brass model of the truck in the room showed its details quite clearly. He considered that truck better than the design proposed by the committee. The feature of special novelty was a pair of diagonal rods passing under the channel bar transoms and attached to eyes on the outside of the diamond frame columns. These rods kept the truck perfectly square, and they had proved a most desirable addition to the diamond truck, remedying its greatest defect—the tendency to get out of square. The combinations of the truck were patented, but the Lehigh Valley Railroad Company were prepared to donate to railroads composing this association the right to use the truck without royalty.

Mr. Miller said the committee had exercised great care in designing the truck recommended, and they had entirely fulfilled the conditions laid down for them. They had all given much attention to the subject, and considered well all the suggestions made for their assistance. He was prepared to defend the work of the committee.

Mr. Goodwin thought the absence of diagonal rods a grave defect, for there was nothing to keep the truck square.

Mr. Forsyth pointed out that the truck was so designed that there was no danger of its getting out of square. The channel bars are so firmly secured to the end castings that no diagonal rods are necessary.

Mr. Goodwin said in bridges, trusses were used at every possible point. In his opinion, truss rods were as necessary for a truck as for a bridge.

Mr. Miller thought truss rods were very important when necessary, but in the truck proposed by the committee the channel bars and web casting were sufficient to resist all strains.

Mr. Cloud agreed with the previous speaker. The Lehigh Valley Railroad design recommended had no cross-channels which induced the necessity for diagonal rods. He wished to see a number of the trucks built and put in service, but it would be well to continue the committee and receive the report as information.

Mr. Forsyth, as one of its members, did not want the committee continued if the report was to be received in that way.

Mr. Miller expressed a similar determination, adding that the truck was well designed, with the parts interchangeable and adapted to either a rigid or swing center.

Mr. Lentz thought the fact had not been sufficiently considered that the parts of any standard truck must go together rough. It might do all right to depend on fixed connections to keep a frame square with finished work, but where only rough iron castings and forgings were joined together, he did not see how some means of adjustment could be dispensed with, unless it were concluded that keeping trucks square was of no importance. He favored retaining the committee for another year, and having some trucks built after the pattern recommended.

Mr. Goodwin wanted it made clear whether we are to keep the truck square by truss rods or by accuracy and strength in mechanical construction. If mechanical construction was to be depended on, machine work must be done in building the truck. He believed keeping trucks square by truss rods, preferable to incurring the expense attached to the other methods.

Mr. Cloud made a motion that the report be received and the committee continued, to report any further details they may think desirable, and that the members of this Association be recommended to build this form of truck.

After some further discussion, the motion was carried.

REPORT ON BRAKE-SHOES, BEAMS, ETC.

Your Committee continued from last year with instructions to submit to this convention a definite form of brake-block and shoe, respectfully submit the following report:

The Committee have selected and agreed upon two forms of brake-blocks and shoes but are unable to agree upon one, and therefore present the two forms for the consideration of the convention. One is known as the "Christie Block and Shoe," and is used on several roads in the north and west, the other is known as he "Collin Block and Shoe," and is used on the Pennsylvania Railroad and its connections, the Lehigh Valley Railroad, and others. The patents on both, we understand, have expired.

As we believe both shoes have their advocates in the convention your Committee has deemed it best to present this form of report, which, with drawings furnished by the Secretary, is respectfully submitted.

L. Packard,
John S. Lentz,
J. N. Marden.
} Committee.

Mr. Forney read the above report on Brake Shoes.

Mr. Forsyth understood the committee was appointed to report on brake gear generally, and he wanted to know how they had confined their attention to shoes alone.

Mr. Lentz explained that they could not come to a decision about anything except the shoe, and that the committee considered was of most importance.

Mr. Goodwin moved that the Collin shoe be accepted by the Association and sent to letter ballot.

Mr. Kirby moved as an amendment that the Christie shoe be accepted and sent to letter ballot. He thought it desirable that the members should be permitted to vote for the Collin or for the Christie shoe as they desired.

Motion and amendment were both rejected.

Mr. Adams had never seen the Collin shoe before, but he liked its appearance. He, however, preferred the Christie shoe, because he believed it could be put on and removed more easily than the Collin shoe. It surprised him that the report spoke of the Christie shoe being used only on several North and West roads, when it was very largely in use in New England. He believed there were patents on the Collin shoe.

Mr. Cloud explained that the Pennsylvania road had bought the right to use the Collin shoe, but he did not appear to have very clear knowledge of the present status of the patents.

Mr. Rhodes did not believe the Collin shoe was what the railroads wanted, for it was too liable to be lost off. The key that holds the shoe is of a form not easily replaced, and badly filling substitutes were likely to be used. This would permit the shoe to work out, when the head would be brought in contact with the wheel wearing off the dovetails, so that it would not thereafter hold a shoe well. He preferred the Christie shoe, had used it a long time and it gave the best of satisfaction in all kinds of service.

Mr. Barr did not think there would be any advantage in adopting either shoe until arrangements were made for maintaining exact sizes. It would be a good plan to have some one dealer furnish uniform brass or iron patterns at a specific price; and brass patterns should also be prepared and deposited in the archives of the association. He wanted a vote on three qualities of the shoes offered, viz., cheapness, strongest fastening, and ease of removal.

Mr. Marden had extended experience with the Christie shoe and expressed himself as being certain that it was less liable to work off than most other shoes. They had made tests to show how long it took to put on and remove different brake shoes, and found the Christie quickest handled. While he considered the Christie the best shoe, he was prepared to use anything the convention might adopt. He explained that the drawings of standards furnished by the association rendered the patterns proposed by Mr. Barr unnecessary.

Mr. Forney thought drawings were not sufficient to prevent confusion as to sizes. If the association adopted a standard shoe, he thought it would be desirable for the executive committee to arrange with some firm to make the patterns.

Mr. Wilder thought if the question came to a letter ballot, roads ought to be permitted to vote against both shoes.

Mr. Adams again testified to the merits of the Christie shoe, and deprecated the spirit displayed by Mr. Wilder in wanting to have both shoes rejected. He favored mutual forbearance, and thought the members ought to be ready to give and take a little for the good of the whole interests involved. Unless this were done, it would be impossible to agree upon any thing.

Mr. R. Hitchcock, Connecticut River Railroad, said they were using the Christie shoe, and had tried nearly all other kinds, but found it superior to them all.

Mr. Marden wished to have an informal standing vote taken to indicate the preference of members.

Mr. Kirby urged the necessity for coming to a decision. Their managers expected that something would be done, and they ought not to be disappointed.

Mr. Cloud objected to an informal vote, and held that action of the kind would be out of order and unconstitutional. He moved that the Collin and Christie shoes be put to letter ballot to decide which, if either, shall be made the standard of the Association, and that explanatory drawings be sent out with the ballot papers.

Some more discussion followed this motion, in which several members urged that whatever shoe was adopted railroad companies should use it. Before Mr. Cloud raised the constitutional objection to taking an informal vote, the members were strongly inclined to take a vote of the kind, and the probability seemed to be that the Christie shoe would have been preferred. The constitutional objection was a brilliant piece of strategy, and it imposed upon the meeting. The motion was finally carried, and the Collin shoe, which had nothing to recommend it above many other ordinary brake shoes, except that it is the standard of the Pennsylvania system, goes to better ballot along with the Christie shoe.

Mr. Wall made a motion that, when the result of the letter-ballot is made known, the Executive Committee shall be empowered to arrange with some individual manufacturers to make iron patterns for the brake shoe, head and key adopted; the same to be made in accordance with the approved drawings. The patterns to be furnished to the railroad companies at a fixed price. The Secretary to notify the railroad companies of the manufacturers with whom the arrangement is made, and the period at which the patterns will be furnished. Carried.

REPORT OF THE COMMITTEE ON A STANDARD HOUSE CAR TO CARRY 60,000 POUNDS OF LADING.

Your committee appointed to report upon a Standard House Car to Carry 60,000 Pounds of Lading, beg leave respectfully to report that they have agreed upon the following dimensions for such a car, and recommend the same for adoption:

Length over end sheathing	35 ft.	
Inside length in clear	34 ft.	
Width over side sheathing	9 ft.	
Width at eaves	9 ft.	5 in.
Height when empty, top of rail to top of eaves	11 ft.	4 in.
Height when empty, top of rail to top of running board	11 ft.	10 in.
Height when empty, top of rail to top of brake shaft	12 ft.	10 in.
Height when empty, top of rail to center of draw-head	2 ft.	9 in.
Height when empty, top of rail to bottom of side sill	3 ft.	
Height of inner lining	5 ft.	
Body bolster to be of iron, 12 in. wide.		
Distance from center to center of trucks	26 ft.	6 in
Width of doorway in clear	5 ft.	4 in.
Width of running board	2 ft.	4 in.

Your committee would further report as their opinion that the matter of framing and trussing this car, as well as of the framing and trussing in general, is not of such a nature as to make it important that the Master Car-Builders' Association should have a standard, inasmuch as uniformity in this would not be greatly advantageous in the interchange of cars and in their repairs. For the above reasons, and because of the varying preferences of the members of this Association, we think it would not be desirable for this Association to adopt a standard for such framing and trussing.

In regard to the matter of a truck for the car on which we were to report, it is the opinion of this committee that we could not at this time do any useful work in this matter, for the reason that there is a special committee of the Association appointed to report on trucks of 40,000 pounds capacity, and it is our opinion that if the Association decides upon a good type of truck of that capacity, it would be desirable to retain the same type for cars of 60,000 pounds capacity, with only such alterations as might be necessary in the size of its parts.

H. Stanley Goodwin,
John W. Cloud,
Leander Garey,
F. M. Wilder,
L. Packard,
Wm. McWood,
R. McKenna,
R. H. Soule,
} Committee.

After the report on a Standard House Car to carry 60,000 pounds was read and accepted,

Mr. Goodwin, who read the report, stated that the dead weight of such a car would be about 29,000 pounds. Journals 4½ × 7 inches were giving good service under similar loads.

Mr. Lentz said they were using a 30-ton car built with the Cloud framing, and it stood the work very well.

A short discussion ensued about the 30 ton car; but no fact of importance was brought out. Most of the speakers appeared to think that 30-ton cars were not called for at present. An effort was made to continue the committee for the purpose of perfecting details about the proposed car, but the decision was finally come to that they should be discharged with a vote of thanks.

When the report on Standards and Appliances for the Safety of Trainmen was called for, Mr. Kirby, chairman of the committee, explained that he was not aware till then that he was on such a committee, a statement which excited considerable amusement.

THE ELECTION OF OFFICERS

was then declared the next business of the meeting.

There had been considerable lobbying done to influence the election of president. When it was found that Mr. Garey would not remain longer in office, an effort was made to have Mr. Cloud nominated, the understanding being that he was to be supported by all parties favoring Pennsylvania interests. During the first day of the meeting it was currently reported round that Mr. Cloud was certain of the nomination. But a canvass brought out the fact that a strong opposition existed to the election of one who was neither a master car-builder nor a superintendent of machinery, and the supporters of Mr. Cloud thought it judicious to transfer their support to Mr. R. H. Soule, who was nominated by the nominating committee, consisting of Messrs. Goodwin, Miller, Rhodes, Wilder and McKenna.

At first there appeared to be a probability that Mr. Soule would be elected as a matter of course, and over forty members were said to have pledged themselves to support him. But after the nomination was made, two parties were organized against the nominee. One party objected that Mr. Soule was a master mechanic rather than a master car-builder, and that it would be discourteous to the association to put other than a car-builder at its head. Another party claimed that Mr. Soule was the Pennsylvania candidate, and they did not want domination of that interest. The result of this feeling was, that Mr. F. D. Adams was nominated as an opposition candidate by Messrs. Hodge, Townsend and McIlwain.

When the business of electing a president was reached, Mr. Adams rose and expressed regret that a contest had arisen; but he considered it only fair and just that a master car-builder should be elected. After mature consideration and consultation with others, he had concluded to withdraw in favor of Mr. B. K. Verbryck, of the Chicago, Rock Island & Pacific Railway. An Eastern man had long been president, and he thought it just that the position should now go to a Western car-builder. He felt no personal antagonism to the regular candidate, and only took part in the opposition through conscientious convictions that a master car-builder ought to be elected. He urged the members to vote for Mr. Verbryck.

Mr. Cloud interrupted Mr. Adams with the objection that the proceeding was out of order, but the objection was not sustained.

On the ballot being taken it was found that 50 members voted for Mr. Verbryck and 25 for Mr. Soule.

Mr. Cloud moved that the election of Mr. Verbryck be made unanimous, which was carried.

While the ballots were being counted, Mr. Garey, the retiring president, addressed the meeting, thanking the members of the association for the uniform kindness they had manifested toward him during the long period he had been connected with them. He expressed a confident belief that the association would continue to increase in power and usefulness.

Messrs. Adams and Soule were selected as a committee to conduct the new president to the chair. Mr. Soule then made a brief speech, disclaiming any disappointment at the result of the election. The nomination had been accepted at the earnest entreaty of his friends, against his better judgment. He had known nothing of the movement till he arrived at the convention, and it was extremely distasteful to him to appear as the representative of the newer members, in what was regarded as an attempt to exercise undue influence in the association. The result of the vote pleased him, and relieved him from what must have been an embarrassing position.

Several times during the remainder of the meeting Mr. Soule presided during the absence of President Verbryck, and his manner in the chair indicated that he would have made a good presiding officer.

The vice-presidents elected were Messrs. McWood, Grieves and Cloud.

Mr. John Kirby continues treasurer.

The Executive Committee consists of Messrs. Lentz, Blackall and Wilder.

Several names were canvassed round as successors to Mr. Forney, who had given such emphatic intimation of his approaching resignation, that most of the members concluded that they were going to lose his valuable services. The Executive Committee, however, did not despair of inducing Mr. Forney to continue secretary, and general satisfaction was expressed when it was learned that he had consented to serve another year at a salary of $2,500.

NEXT PLACE OF MEETING.

The committee appointed to select a place for holding the next convention agreed on Boston, but when they made their report not a single member voted for the Hub. Niagara Falls was suggested as a good place, and the meeting immediately decided to go there.

VOTE OF THANKS.

Resolutions were passed thanking the proprietor of the Hygeia Hotel for courtesies extended to members and their friends; also thanking Mr. T. L. Chapman, superintendent of motive power of the Chesapeake & Ohio Railroad, and the railroad company he represented, for favors extended to members and their friends.

The committee on correspondence reported, recommending that all correspondence relating to car couplers be left to the Executive Committee.

When the report on Passenger Car Framing and Trussing was read and adopted,

Mr. Bissell explained that in making the selection of framing, the committee recommended what they had most favorable experience with. But they did not consider that the only good form of framing. Roads having satisfactory methods of their own are not likely to change. But his long experience with the Pullman Car Company made him believe the style of trussing recommended to be very efficient. Any one wishing to have blue prints of the framing can have them.

Mr. Miller did not think there was any special merit about the framing and trussing recommended by the committee. Other styles were equally satisfactory and he thought the report should be received only as information.

Mr. Rhodes moved that the report be received and put on the records of the Association. Carried.

The Committee on Automatic Freight Car Brakes submitted their report, which was read by Mr. Rhodes.

REPORT ON AUTOMATIC FREIGHT-CAR BRAKES.

In submitting a formal report on the above subject, we feel some hesitation, owing to the importance of the question and a conviction of the superficialness of our investigation ; this conviction, in place of diminishing as different brakes were examined, only seemed to increase. A complete report on Automatic Freight-Car Brakes should be accompanied by an elaborate and thorough series of comparative trials and tests, which it is hardly necessary to say was quite beyond the limited field of the Committee, nor will such investigations be accomplished until a more general interest is taken in the different forms of brakes by your respective companies.

In considering this subject, your Committee at first proposed confining their attention to such brakes as the lines represented in the Association had adopted or successfully experimented with, and with this intent issued a circular of inquiry to each member. From the replies received the question seems to have had very limited attention, and your Committee in some cases were obliged to pursue their investigations through sources and courtesies of companies on which they had no claims whatever.

It may be well to state here that the brakes named later in our report have not in any sense been selected on account of specially recognized merit; they are mentioned simply because your Committee have seen each on cars in actual service, and we hope by directing attention to certain features of one which may be wanting in the other, to aid our members in determining what points are necessary for the success of an automatic freight-car brake. The types of automatic brakes that are being brought to the notice of railroad companies for freight-car equipment may be classified under 4 general headings: 1. Buffer brakes; 2. Friction brakes; 3. Air brakes; and 4. Electric brakes.

1. *Buffer Brakes.*—Of these there are many patented, though few as yet in actual service. Three only were drawn to our attention in time for investigation, *i. e.*, the American brake, the Rote brake and the Prescott brake. Briefly described, the buffer brake consists of a connection with the brake levers which engages or disengages from the back of the draw-bar; this connection is controlled in some cases by a governor secured to the axle; in others, by hand adjustment. Any one draw-bar being compressed transmits the compression and consequently applies the brakes throughout the entire train, regardless of whether they are continuously connected or not. The application is, of course, in accordance with the amount of resistance offered. Of this type, we find the American the most largely introduced. Up to May 20 they were equipped on the following cars :

St. Louis & San Francisco	2,000
Wabash, St. Louis & Pacific	650
New Haven & Northampton	100
Connecticut River	50
Chicago, Milwaukee & St. Paul (trial train)	15
Total cars	2,815

The brake is controlled by a governor revolving with the axle; at low speed it is out of action, allowing the cars to be switched about a yard or pushed out of it in case of an up-grade, without any interference of the brake. At speed it operates equally well, whether moving forward or backward, and without any readjustment. The cost of the brake is $15 a car.

The Rote is also controlled by a governor attachment to the axle, but differing from the American in construction and action. Both are ready for application after from 2 to 4 miles of speed is reached, the former, however, only in pulling; it is inoperative in backing. Again, the former throws off automatically when the train comes to rest, while the latter remains applied until the compression of the draw-bars is removed by taking up the slack, an advantage for the Rote in running past a specific stop such as a coal or water station, or in case of accidentally running an engine and car of a train off a stub switch, but a disadvantage if stopping on a downward grade. Ten cars of the New York, Pennsylvania & Ohio have been equipped with this brake for several months. Last December, we have been informed, a contract was made with the New York, New Haven & Hartford Co. for the equipment of all its freight cars ; none, however, have as yet been applied. The cost of the Rote brake, as mentioned in one of the company's circulars issued in December, 1884, is $31 per car. We are under the impression this includes application, which is not the case in the other figures we have given.

The Prescott brake has been in use some nine months on a train of cars of the Central Vermont Railroad ; it is also in use on 10 cars of the Delaware & Hudson Canal Co. It is rendered operative or inoperative by hand adjustment. It is only operative when pulling. In backing, the brake has to be rendered inoperative—an obvious disadvantage. The cost is $8 a car.

2. *Friction Brakes.*—Under the second classification there are also numerous devices. Your committee have investigated the Widdifield & Button only. It is in use experimentally on 12 cars of the Lehigh Valley road. The compression of the draw-bar here acts by a system of levers on a pair of friction pulleys. One of these pulleys is of fibre and soft metal and is cast on the axle; the other is of cast iron and is mounted on a transverse spindle, so arranged that the faces of the pulleys are brought in contact, producing, as before stated, an amount of retardation corresponding to the compression. The brake acts only in the direction in which the handle of the lever is thrown. When a train is to move forward, care must be taken that all the handles are pointing forward, and compression of the draw-bars will then apply the brakes, but they are inoperative in backing up. Should it be desirable to have the brakes operative, in case of a long back up, it can be arranged by reversing this lever on each car. When the brakes are applied and the train is brought to a stop, they remain applied until the slack is taken up, as with the American ; the Prescott, however, has this additional feature: in the above case the brakes may also be thrown off by putting the handle in a midway position ; this cuts the brake out whether applied or not applied. This cutting out feature is important, as it allows the use of pushers up grades, temporarily, of course, doing away with the brake on the cars pushed, and necessitating a readjustment when the summit is reached. This brake may be seen by members of the convention under the sample 60,000-lb. box car (No. 7,599) of the Lehigh Valley. The cost of the brake is $10 per car.

3. *Air Brakes.*—Our next classification is the air brake, representing which we have taken the Westinghouse automatic. It is by far the most expensive brake, costing $50 per car, exclusive of fitting up, in addition to which it is necessary the engine be fitted with an air pump, which for each engine and tender entails an additional outlay of $360. The brake, however, is very effective, and the only one your Committee considers comes properly under the heading of automatic. Once coupled up it is ready for use, going in either direction, whether pushed or pulled, at low speed or high speed, and may be applied by the conductor from the last car connected to every car, including the engine, as well as by the engineer. The brakes do not act independently, as is the case with compression brakes, but they have to be connected continuously from the engine. Even with compression brakes, however, it should be borne in mind that with partially equipped trains the most effective results are obtained when the cars are placed in the forward part of the train, as it is there they get the greatest compression. Notwithstanding the cost of the Westinghouse, we find it the most largely introduced. Up to May 18, the following orders have been filled:

Atchison, Topeka & Santa Fe (9,371 ordered)	7,140
Atlantic & Pacific	50
American Refrigerator Transit Co	25
Chicago, Rock Island & Pacific	50
Chicago & Northwestern	100
Chicago, Milwaukee & St. Paul	50
Chicago, Burlington & Quincy	120
Central Pacific	10,600
Central, de Guatemala	51
Denver & Rio Grande	30
Galveston, Harrisburg & San Antonio	2,000
Missouri Car & Foundry Co	30
Northern Pacific	930
New York, Ontario & Western	22
New York, West Shore & Buffalo (wrecking cars)	8
Old Colony (25 ordered)	10
Pennsylvania	227
Union Pacific (11,580 ordered)	2,800
Total cars	24,243

In addition to the above, 6,806 sets of the Westinghouse non-automatic brakes are in use on the freight cars of five different lines, one of which is the Denver & Rio Grande.

4. *Electric Brakes.*—Your Committee have had no opportunity of investigating.

General Remarks.—In reviewing the foregoing, and without entering more fully into explanatory details, the main question to be considered by members of this Association and managers of railroads seems to be a choice of two types of brakes, the automatic air brakes or the cheaper compression brakes. It will be said by some this question of brakes is not a new one; it is new, it is true, for freight service, but we have had an ample experience with various types of brakes in passenger service for years past, from the hand brake upward, resulting in the air brake being recognized and adopted by almost every railroad management in the country. If compression brakes are equal to or better than air brakes, why don't their advocates undertake to fit up our passenger equipment with them? A very natural reply is that the passenger equipment of railroad companies has had the expensive air brakes applied, and, inasmuch as it does its work efficiently, it would be very difficult to have its place taken by any other types of brakes, even though superior in many features. The compression-brake advocates therefore recognize they will meet with more success by giving their attention to a field not yet so fully covered. This is a plausible, but nevertheless not a true, answer to the question. The reason compression brakes are not applied to passenger equipment is because they do not fulfill the requirements of the service as well as air brakes ; they are not automatic in every respect, as the air brake is ; a conductor or brakeman on any part of the train cannot at a moment's notice apply the brakes on every car and engine in case the train parts while running; the brakes are not instantaneously applied on every wheel of both sections of the train. These, together with other features, might be cited as making the air brake indispensable for passenger service.

Are not, then, the same points desirable for the success of an automatic freight car brake? Your Committee think they are beyond any doubt desirable, but how to accomplish it is not so clear. In the United States and Canada there are some 800,000 freight cars. To equip these with air brakes at $50 a car would cost $40,000,000 ; the same number of cars at $10 would cost $8,000,000. Compression brakes are unquestionably in advance of hand brakes, and with many lines might be available at $20 to $30 a car, but could not be considered at $50 and $60. Your Committee therefore recommend that in place of adopting any specific type of brake or brakes at this convention, the subject be continued for further investigation; that the new committee be instructed to endeavor to have made a series of comparative tests with trains wholly and partially equipped with such brakes as may be in actual service, and that the members urge their managers not to confine their experiments to any one brake, so that their representatives may come to the convention ready to say what brake they are prepared to advocate, and fortified with their own experience for and against the less favored devices.

B. WELCH,
GEORGE HACKNEY,
GODFREY W. RHODES, } Committee.

Mr. Miller inquired if no vacuum freight car brakes had been inspected by the committee.

Mr. Rhodes replied that no attempt at an exhaustive list had been made, and no vacuum freight car brake had become prominent enough to attract much attention.

Mr. Wall moved that the Committee be thanked for their report and continued. He considered that they had given very valuable information to the association.

Mr. Garey supported the motion. When this subject of automatic freight car brakes was introduced years ago, he and many other members were skeptical about such a thing ever being practicable. But the condition of matters were now greatly altered, and most of them had changed their opinions. If a good automatic freight car brake were adopted, he was convinced that trains could be run much faster and safer, and that repairs to cars would be decreased. If the means of running freight trains safely at 25 or 30 miles an hour were provided, the capacity of many roads would be doubled, and every man in the country was interested in bringing about a result of that kind.

Mr. Rhodes said the committee labored under the disadvantage of none of them having experience with more than one automatic freight car brake. He thought it would be advisable to add to the committee other members having experience with other freight car brakes. This suggestion was eventually followed, the additional members to be nominated by the President.

Mr. Forney asked Mr. Rhodes if he found that trains could be accelerated by the use of an automatic freight car brake.

Mr. Rhodes answered, it was with that object in view that they had adopted automatic brakes for part of their freight-car equipment. Experience with the use of the brake had shown them that trains could be run much faster with perfect safety. An engineer had told him that with seven cars having automatic brakes in the front end of a train he could get over the road with safety, and make much better time than when he had to depend on brakemen.

Mr. Forney said that by increasing the capacity of a freight car you got an automatic brake to do its work at a reduced cost. To keep down expenses, the increase in capacity of cars must keep pace with the introduction of automatic brakes.

Mr. Garey wished to know if the practice was becoming general to put the brakes on eight wheels of freight cars. Mentioned case where an engineer failed to stop a train in the distance calculated, and had an accident. The cause of the mistake was that the capacity of the cars had been materially increased, without a corresponding increase of brake-power.

Mr. Whitney found that wheels of cars near the hind end of a train often broke going down a long hill. The cause of this was that brakemen went out from the caboose and put on a few brakes behind, leaving them to do all the work, so the wheels got hot and broke about the time the bottom of the grade was reached. An automatic brake would prevent this trouble by distributing the work over more wheels.

A desultory discussion on brakes ensued in which Messrs. Adams, Barr and Garey participated, but nothing of importance was brought out.

TRAP-DOORS IN THE ROOFS OF PASSENGER CARS.

When the report of the committee on this subject was called for.

Mr. F. D. Adams, the chairman, mentioned that he had sent out circulars on the subject to which only 15 replies were received. From these and the investigations he had himself made, he became convinced that there was no need for trap-doors in the roofs of passenger cars, consequently he had not prepared a formal report.

Mr. Forney explained that the action on this subject had originated in a suggestion and inquiry of the New York railroad commissioners. These commissioners were interesting themselves in the subject merely with the view of increasing the safety of railroad travel, and he thought the Association ought to give it careful attention. He believed a trap door in the roof of a passenger car would be an element of safety.

Mr. Adams believed that with the large windows now used in passenger cars there would be no need for trap doors, and that no passengers free to move round would have difficulty in getting out of an overturned car. If the windows were not sufficient, there were tools carried for breaking a hole. It was not generally for want of means of egress that passengers got imprisoned in a car. It was through their getting fastened down by débris. He had gone through that experience in an accident to a train.

Mr. Rhodes asked why they did not want a trap door in the floor as well as in the roof.

Mr. Garey thought it was not surprising that the railroad commissioners should want trap-doors in the roofs of passenger cars. He believed in providing every means of security to life, and thought trap-doors should be put in roofs and floors, especially in mail, express and baggage cars. He thought the day was not far distant when railroad commissioners would insist on this additional safeguard being provided.

Mr. Wall moved that before the committee are discharged, they should be required to find out all the reasons against the use of trap-doors, so that they might be submitted to the railroad commissioners, one member to be added to the committee.

After a lengthy discussion this motion was agreed to.

Mr. Forney believed that the railroad commissioners of New York, and other States were as good judges as to what was needed for the safety of passengers as the master car-builders. He could personally see no reason why trap-doors should not be put in the roofs and floors of passenger cars.

Mr. Bissell thought holes would introduce a new element of danger.

Mr. Miller spoke of the mechanical difficulties encountered in putting trap doors in roof and floor of cars. He preferred a window to a trap door.

Mr. Briggs did not think it would be wise for the Association to put itself on record as being unable to put a trap door into the roof of a car. He thought something of the kind desirable.

Mr. Soule said the action of the committee in proposing to lay this subject on the table was based on a fallacy. Their action reminded him of a story told about the famous railroad financier, Jim Fisk. That gentleman was asked to subscribe money to help pay the expense of erecting a fence round the grave-yard of his native village. He refused to do so, making the explanation that no one wanted to get inside and those who were there were not trying to get out. He thought it was the duty of railroad companies to give the passengers a chance to get out of a car in case of accident; and to act in the way proposed would be discourteous to the railroad commissioners.

Mr. Forney moved that one member who believed in trap-doors be put on the committee. He asked several car builders if trap-doors were practicable, and was answered in the affirmative.

Mr. McKenzie had spoken to several Western railroad managers about trap-doors, and their opinion was that the trap-doors would have to be securely fastened. He had been in a wreck where the cars were overturned, and they all got out easily through the windows. Told a funny story about a German who was cut by the glass.

Mr. Rhodes mentioned a case where an accident happened to a train and several of the cars were burned, but the passengers were got out by the windows without difficulty.

A kind of conversational discussion over the subject was continued for a considerable time, and several resolutions were proposed, but they were voted down. Very few of the members favored trap-doors, but most of them desired to treat the railroad commissioners' inquiries with respect.

REPORT ON SIDE-DUMPING AND DROP-BOTTOM COAL CARS.

Your committee appointed to investigate the subject of side dumping and drop-bottom coal cars, respectfully submit the following report :

A series of questions bearing on this subject were circulated by the secretary among the members of the association. From them 15 replies were received. Twelve expressed themselves as not using this style of coal cars, and consequently no information was received from them, while three expressed themselves freely in regard to their use and sent drawings. One from Hot Springs Railroad showed the use of 3-truck cars with a double drop-bottom and its advantages; one from the Flint & Pere Marquette Railroad showed the drop-bottom car in connection with drop-end, in order, to empty the whole load, and thus dispense with any shoveling ; and one from the Chicago, Burlington & Quincy Railroad showed the location of car chutes, and strongly recommended the 8-wheel car. Your committee find that each railroad company differs a little in regard to style of car. Some prefer side-dumping coal cars and some prefer them with drop bottoms. This, we find, is owing to the different requirements of each road. We would recommend the 8-wheeled drop-bottom coal car, as shown in drawing furnished by the Chicago, Burlington & Quincy Railroad, as being the best for all practical purposes.

Jas. Townsend,
John Hodge,
C. E. Gore,
Committee.

Committee discharged.

This report was read, and, on motion, the committee discharged. No discussion ensued.

The report on Standard Dead Blocks was disposed of in the same way.

REPORT ON STANDARD DEAD-BLOCKS.

The Committee appointed to report on this subject have found on investigation, and from the replies received in answer to their circular of inquiry, that thus far comparatively few of the railroads in the United States and Canada have adopted all the standard dimensions for dead-blocks recommended by the Association. Very material deviations from these dimensions exist in the practice of the different companies.

They have also found that there is much difference of opinion concerning the details of dead-blocks, and that it was not easy to design any form and method of construction and attachment which would be generally acceptable to the officers of different companies.

Before such a design can be made, the opinions of those officers must be reconciled with each other, and the views of the Committee must be framed so that their recommendations will comply with the requirements of those in charge of the car departments of the leading roads. More time will be required to do this than the Committee anticipated, and they consequently find themselves unprepared to make a final report at the present time, and all that they are ready to do now is to report progress and ask to be continued for another year.

Charles Blackwell,
M. N. Forney,
G. W. Demarest.
} Committee.

Questions proposed by members for short discussion were declared in order, and one was proposed as to the spring of the standard axle under a load of 40,000 pounds. Measurements made by members showed that under heavy loads the wheels were from ⅜ to ¾ in. further apart at the top than at the bottom, this difference being due to the spring of the axle. It was not regarded as a source of danger.

REPORT ON END PLATFORMS FOR FREIGHT CARS.

Your committee on the comparative advantages of the two methods of constructing freight cars, with and without platform timbers or end sills projecting from the ends of the cars, have had trouble in preparing a report, as some of the committee wanted platforms and others did not; and, as you will admit, it is difficult for a party to succeed, either in politics or car-building, when its members will not agree upon a platform.

From the answers to the circular of inquiry sent out, it is generally conceded that the time is not ripe for the association to fix a definite standard for this portion of our freight cars.

While your committee appreciate the fact that it would be an extremely satisfactory condition of affairs if this question was settled, and would very materially clear the decks for your action on the standardizing and making uniform for all cars such appliances as running board extensions, steps, ladders, hand holds, brakes, draft-rigging and details for operating automatic couplers; yet, nevertheless, the opinions of the railroads on the merits of the two forms of construction are so uncompromisingly opposite, that we have concluded that we could best serve the interests of the association by putting on file for future reference a summary of the advantages and disadvantages of the two systems, with a hope that the facts in the matter having once been investigated and discussed, and the merits and demerits thoroughly understood by the opponents of each plan, the railroads will be in the position to give a consideration to this particular portion of car construction that has not been accorded it heretofore.

We cannot help but think that our report, together with the resulting discussion, will have an effect in causing some of the railroads to change their present practice, either to adopt or reject platforms, and that in a few years, when this subject could be very properly taken up again, a future committee would find more uniformity throughout the country, and thus be able to advise the association to adopt a definite standard.

We have tabulated the replies of inquiry, and out of a total of 182,923 cars represented, 101,108 are equipped with end platforms and 81,815 are without them.

Some of the roads have both styles of construction, but are in favor of one or the other. Placing the cars that they represent altogether under the head of the form of construction they prefer, we find that roads representing 103,057 cars, or 56 per cent. of the whole number represented, are in favor of platforms, while roads representing 79,866, or 44 per cent., are in favor of no platforms. Seven roads have cars with both kinds of construction, and may, therefore, be said to have had the fullest experience with the merits of each form. Of the seven roads, four are in favor of platforms and three opposed. Of the 23 railroads that have replied to the circular, 7, or 30 per cent., are in favor of platforms, and 16, or 70 per cent., are opposed.

From this it will be seen that the largest vote, when measured by the number of railroads, is against the platforms.

The former, as is well understood, is the crucial test in this association. For convenient reference we have prepared full-size side elevations of the ends of two cars representing a modern type of car having the end platform, and of two representing a modern type of car without the end platform.

As there is evidently a misunderstanding in the nature of the differences of the two forms of construction in the minds of some of the members who are only using one form, we would call your attention to the fact that it is the practice on the largest proportion of the roads having cars fitted with end platforms to use double brakes, one a tunnel brake that is operated from the platform, and the other having the brake-shaft extending above the roof and operated the same as the brake-shaft on cars without platforms.

In the sketches of the car without platforms, the ladders are shown on the face of the ends. It is, however, a very common practice in this country to place the ladders on the sides near the ends. We will consider the other answers to our circular under three heads :

1. Safety to trainmen.
2. Economy in construction.
3. Facility in transportation.

1. *Safety.*—Cars with end platforms provided with deadwoods give trainmen, when standing upon the ground, coupling or uncoupling cars, a living space for their arms and shoulders above the platforms,

Steps and hand-holes are provided at all four corners of the car, instead of simply on two diagonal corners, as on cars without platforms. A man, therefore, has twice as many chances to get on a moving train as he has on the cars without platforms; and staking into consideration cars without platforms having ladder on the sides, trainmen are exposed to the danger of being torn or scraped off by obstructions in yards or by bridges. Neither can they jump from a moving train on such a car with the same facility as on one equipped with the platforms, since on the latter there is a vertical hand-hold immediately over the step. In switching, a man is able to pull a pin from moving cars while standing on the platform, and thus avoid the danger of stumbling or catching his feet in the frog when running between cars where there are no platforms.

A position of safety is afforded on roads having tunnels and through bridges by the end platforms, as trainmen can be out of danger and still have control of the brakes. Also in extreme cold weather they can ride on the platforms, sheltered from the wind.

Extension running boards are now almost universally used on cars having end platforms. The sketches show extension running boards on both kinds of cars. The total distance necessary for a trainman to step from car to car, when provided with end platforms, is 22 inches ; without platforms, 17½ inches.

The greatest possible compression of the draft spring never amounts on the former to more than 26 inches, and on the latter to 21½ inches. The actual difference between the two forms of construction of 4½ inches is therefore not important enough, when taken alone by itself, to decide the adoption or rejection of either one or the other of the two plans.

End platforms furnish an additional safeguard to trainmen in the event of their falling between cars from the roofs or the ladders; the platforms very often save them from falling upon the track. On a car where the ladder is on the face of the end, a trainman is almost certain, if the ladder gives way or he loses his hold, to fall upon the track.

There are two objections that have been urged against end platforms on the score of safety, besides the one answered above, with reference to the distance between cars.

First, that in case of a sudden call for brakes, the trainmen would not descend to the end platform to apply them, on account of the probability of their being crushed. It was shown in the above explanation that the majority of cars provided with end platforms have double brakes, with one brake-shaft extending above the roof the same as on the cars having no platforms, thus affording trainmen an opportunity to apply the brakes without descending to the platforms. The second objection relates to the possibility of the accumulation of snow and ice on the platforms. This objection certainly does exist ; but it is the experience of the majority of roads having cars equipped with platforms that either the one or the other platform of two cars coupled together is free from this obstruction, and the trainmen have always an opportunity of getting a good hand-hold to steady themselves from either the long brake-shaft, the tunnel brake chain or the wooden ladder.

2. *Economy.*—Your committee has not been able to satisfactorily prepare a statement of the comparative cost of the two forms of construction, as the details vary greatly on all the roads.

There is, however, an agreement among us that the first cost of construction is a little in favor of the plan without platforms, owing to the slight increase in the length of sills, truss-rods and bolts, the addition of the platform plank and a sill-cup to make a bottom piece for the bracing in ends, although some of this is offset by the cost of the extra timbers used for carrying the deadwood. In economy of repairs and cost of maintenance the end platforms have an advantage. A broken sill can be renewed without disturbing the end-posts, bracing or covering of the car. In repairs to the draft-rigging, the work can often be done by renewing the draft-bolts in end sills, thus doing away with the necessity of going into the car and removing its lading. The platforms admit of a larger end sill. As this is the point where the car receives its greatest shocks, it is important that it should be as strong as possible.

Those roads using both styles of construction have not reported that they have discovered any difference in the life of the two kinds of cars, owing to the claim advanced by some of the members, that there was a greater strain on the sills of cars with platforms, due to their slightly increased length.

It has been claimed that the sills on platform cars are liable to rot out more rapidly than on the other class of cars.

This is not the case where the platform plank is used, gained so as to have lips covering each sill, yet open between the sills to allow the water and snow to drain from the ends of the car on to the ground.

3. *Facility in Transportation.*—It is claimed that cars without end platforms possess advantages, enabling longer trains to be placed on shorter sidings. This, however, is only true with modern cars when the trains are longer than is the general practice throughout the country.

The Pennsylvania Railroad car shown in the sketch is 37 feet 6 inches from face to face of bull-nose. The New York Central car is 36 feet 8½ inches between the same points, the difference being 9½ inches; therefore a New York Central train would have to consist of 46 cars before it would equal one more car in the same length in feet of a Pennsylvania train.

A New York Central Car has an inside length of 33 feet 6 inches, a Pennsylvania, 34 feet; there is, therefore, 6 inches more effective loading space in the Pennsylvania car. In a train of 46 New York Central cars there would, therefore, be only 11 feet more of effective loading area than in a train of 45 Pennsylvania cars.

As there are very few roads in the country that regularly run, excepting on a few divisions, trains of 46 cars, it will be seen that the majority of the companies represented in this Association do not realize any advantage whatever with cars without platforms on the score of placing more of them on a siding.

The end platforms are superior to the cars on which they are not used in shifting in yards, it not being necessary for trainmen to get up on top of cars to apply the brakes. They can with greater ease catch a cut of cars, as they can get on them at any corner they desire and use the tunnel brake. Then, again, the tunnel brake is the only form of brake that can satisfactorily be used on cars passing into covered freight stations, warehouses or grain elevators.

If we compare end-platform cars with those without platforms having the ladders on the sides near the ends, it will be seen that on the former wooden ladders with good, heavy rounds placed far enough from the face of the ends to give a man a firm footing can be used, while on the cars without platforms it would be unsightly to use anything else than iron ladders with small rounds placed close against the siding.

Freight cars can be built wider when the ladders are not placed on the side. Platforms protect the housing of cars from damage on sharp curves. On some of our roads it has been found necessary with the growth of business and increased value of property in cities and on docks to make curves far sharper than was formerly the practice, and it has actually been established on some of the roads that two cars coupled together without end platforms cannot be run on some of the curves in our cities without the inside corners striking and doing damage.

With the advent of the automatic brake on freight cars it will be necessary to adopt a double brake, and if we desire to realize the fullest advantage of the brake on both trucks, it will be necessary to place brake wheels at both ends of the car, and we consider that it would pay to have one of these brake wheels located like the tunnel brake wheel, so that a man could operate it in yards without requiring him to mount to the top of the car.

General Conclusions.—Cars provided with end platforms are safer than those without. The first cost is a little more, but their maintenance is less. They possess greater facility in transportation, especially on roads having through bridges, tunnels, city and water-front properties.

Of all the cars owned by railroad companies represented in this report, 56 per cent. are in favor of end platforms.

B. K. Verbryck,
Edward B. Wall,
} Committee.

The following table shows the number of cars with and without end platforms on the roads from which statements were received :

	Number of cars			References.	
	With platforms.	Without platforms.	Total.	For.	Against.
Boston & Albany	......	6,000	6,000	....	against
Baltimore & Ohio	15,967	......	15,967	for	....
Burlington & Lamoille	......	35	35	....	against
Central Vermont	......	2,229	2,229	....	"
Chicago, Burlington & Kansas City	......	493	493	....	"
Cleveland, Columbus, Cincinnati & Indianapolis	......	5,326	5,326	for	....
Cleveland, Mt. Vernon & Del.	59	696	755	....	against
Chicago, Burlington & Quincy	......	16,000	16,000	....	"
Cincinnati, Washington & Balt.	971	226	1,197	for	....
Flint & Pere Marquette	......	925	925	....	against
Grand Trunk	......	7,573	7,573	....	"
Houston & Texas Central	785	222	1,007	for	....
Lake Shore & Mich. Southern	......	16,000	16,000	....	against
Lake Erie & Western	......	2,000	2,000	....	"
Lehigh Valley	2,226	1,032	3,258	....	"
Michigan Central	......	7,505	7,505	....	"
Norfolk & Western	5,000	2,500	7,500	....	"
Norfolk Southern	......	140	140	....	"
Northern Pacific	......	9,000	9,000	....	"
Providence & Worcester	......	453	453	....	"
Pittsburgh, Cincinnati & St. L.	10,100	460	10,560	for	....
Pennsylvania Company	20,000	3,000	23,000	"	....
Pennsylvania Railroad Co.	46,000	......	46,000	"	....
Total	101,108	81,815	182,923	7	16
Add cars in favor; deduct cars opposed	1,949	1,949	....	....	....
	103,057	79,866	182,923	7	16
Percentages	56.3	43.7	....	30	70

The above report was read by Mr. Wall, who had the table of cars, drawn in large size, hung on the wall.

Mr. Verbryck explained that although he signed the report, he did not agree with its conclusions.

Mr. Rhodes complained of the backward tendency of members in answering circulars.

Mr. Garey wanted to know if it had not been proved that the increased distance between cars due to end platforms seriously increased the resistance of trains.

Mr. McKenzie did not think the report fairly represented the railroad freight cars in use, and he wanted the committee continued.

Mr. Wall objected to the committee being continued. He thought the committee had done all that could be expected of them. The time is not yet ripe for the adoption of a standard car, and when that time comes round, more information can be gathered.

Mr. Davenport was filled with admiration for the ability displayed in the report in making out a case to suit the end plaform advocates. But he wanted the committee continued, so that some facts might be obtained regarding the relation between cars having platforms and cars without them.

Mr. Bissell moved that the committee be continued another year, with power for the chairman to add two new members. This motion was agreed to.

Mr. Forney moved that the thanks of the Association be tendered to Mr. S. H. Harrington, chief draughtsman of the Chicago, Pittsburgh & St. Louis Railroad, at Columbus, O., for the admirable drawings furnished with the last report.

REPORT OF THE COMMITTEE ON PASSENGER CAR FRAMING AND TRUSSING.

The committee did not regard this subject of so much importance to the Association as the other subjects which relate to freight cars and the parts affecting their interchange. They have not, therefore, given it such full attention as to enable them to make an exhaustive report. They present plans for the framing and trussing of passenger cars—one for cars 50 feet long and under, the other for cars above 50 feet long. The short cars have simple arched bracing extending between bolsters, with but two diagonal pieces in each side truss. An iron truss rod under the car, 1⅛ inch diameter, and a flat bar ⅜ × 2 inches, extend directly under the window sills between bolsters, thence diagonally ⅞ inch rod to bottom of sill near end of car. The truss plank is 2½ × 12 inches.

The truss for cars longer than 50 feet is similar to the above, with the addition of short auxiliary diagonal braces 1¾ × 4 inches, one below each window with ¾ inch vertical rods.

They regard those as the simplest and best form of combination wood and iron trussing. They present also a plan of the Challender sheet iron truss in general use on the C., B. & Q. Railroad for coaches of about 50 feet in length.

The truss is strong, stiff, durable, and economical in repairs. The first cost is slightly in excess of the usual forms of coach trusses, but it is recommended as a good substitute for them.

Thos. A. Bissell,
Wm. Forsyth
Robt. Miller.
} Committee.

RULES OF INTERCHANGE.

The above subject was considered at great length by a committee of the Master Car-Builders' Association, and it was decided that in future these rules should be revised, not by a committee, but by the Association. The changes made in the rules were not generally of an important character, but they elicited vigorous discussion at almost every step. A striking characteristic of the discussion was the strenuous persistency displayed by the members representing the Pennsylvania Railroad system, to have their own way, and to yield no iota to changes or requirements that did not coincide with the interests of that system.

Other members were willing to yield points for the sake of obtaining a basis of agreement, but the Pennsylvania men made it apparent that the only way of reaching unanimity was for all other roads to adapt their equipment and methods to those of the Pennsylvania road. The struggle toward this end was most ably conducted by men better posted in parliamentary tactics than their associates, and no sharp move was neglected that would clear the way to success. Few of the members cared to fight the Pennsylvania men in the convention, but the complaints outside were loud and deep.

One important change made at the instance of the Pennsylvania leaders was what amounted practically to reducing the size of axles under freight cars. This was a curious movement at a time when car loads are constantly on the increase, and it was understood to be fought through that the roads in favor of the change might be able to use up an accumulation of old axles that were worn below the M. C. B. standard.

Rule 20, relating to cars damaged on private tracks, and which had become famous by protests made against it, was made Rule 18, and now reads: "When a car is damaged or destroyed on a private track, the railroad company delivering the car upon such track shall be subject to the same responsibility as if the damage or destruction had occurred on its own track."

CAR-COUPLERS.

After finishing the revision of rules relating to interchange of cars, the convention went into special session to consider the question of car-couplers. It was generally expected that the master car-builders would come to some decision about car-couplers at this meeting, and the car-coupler men were present in force. Several railroad commissioners were also present, expecting to obtain information that would guide them in recommending legislation on the subject. From the start it was apparent, however, that those interested in patented car-couplers, and those interested in legislating automatic car-couplers into use, were more anxious than the Master Car-Builders for decisive action.

The proceedings were opened by the Secretary, M. N. Forney, reading the call for the meeting, in which he directed attention to the fact that in a number of States the legislatures had made the use of automatic car-couplers obligatory. As no single form of coupler had been specified, there was a likelihood that great confusion would arise from the use of different forms of self-couplers, and that the danger to trainmen might be increased instead of diminished. The railroad companies, through the master car-builders and other representatives, were invited to take action on the matter.

Mr. Marden mentioned that the legislature of Massachusetts had made the use of certain car couplers obligatory on railroad companies. His company had adopted a coupler that worked very well, and coupled without difficulty with most other drawheads. He was decidedly in favor of a coupler that coupled on a vertical face.

Mr. Forney read a letter from the Railroad Commissioner of Missouri, commending the work that meeting was engaged upon, and urging them to decide on recommending what they considered the best form of car coupler.

Mr. Townsend said they had 125 cars equipped with the Janney coupler, which had been subjected to severe tests and hard service. It had gone through the tests without any failure, and he regarded it as perfectly satisfactory in every respect.

Mr. Blackall moved that the subject be laid on the table. The motion, on vote, was rejected by a small majority, few of the members voting either way. Discussing this motion,

Mr. Marden expressed the belief that they would not be doing themselves, the railroad companies, or the people justice by refusing to discuss the subject of automatic car couplers. It would look as if the Master Car-Builders were not able to handle the subject. He thought something ought to be done now toward settling the matter. He wanted to hear the opinions of the railroad commissioners present. There was one thing about the Janney coupler he did not like. It would not couple unless put in position, which he regarded as a radical defect. The Cowell coupler, on the other hand, was perfectly automatic.

Mr. McPherson, Railroad Commissioner, was called on by the president to give his views, and he responded by saying that he came there to listen. He expected to be able to learn something about automatic car couplers from hearing practical railroad men discussing the subject.

Mr. Kirby said his road had begun to move in the direction of automatic car couplers, but they had not been going very fast. They were using the Ames coupler, and he was very favorably impressed with its efficiency. They were anxious to end the hazardous business of coupling with link and pin.

A car coupler inventor having asked leave to address the meeting,

Mr. Cloud said he did not think they could make any progress by listening to inventors or by examining special couplers. He was in favor of the members expressing themselves freely about the car coupler question. Believed the railroad commissioners and legislatures, by forcing certain couplers into use, would make the work of trainmen still more dangerous by introducing various forms of couplers very hard to couple with each other.

Mr. Rhodes reminded the meeting that the last convention had agreed upon the principle on which an automatic car coupler should work. One feature, that of coupling on a vertical face, had been agreed upon, but important details were lacking. The association had not said how the jaws should come together, and the result was that different couplers, invented on the principle agreed upon, had the jaws so constructed that they would not couple with other inventions that fulfilled the single reqirement of coupling on a vertical face. He asked that this be remedied.

Mr. Cloud moved "that it is the opinion of this convention, that the independent action of State legislatures, enforcing the use of some form of automatic or safety coupler, is already resulting in greater danger to employés in coupling cars than they were subjected to before such action went into effect, and that any similar further action of legislatures will increase the danger to employés." The resolution was passed.

Mr. Smith said they had now thrown down the gauntlet, and it was necessary they should do something decided. There ought to be an absolutely uniform coupler. To obtain this, all except one must give in, and it would be a difficult matter to bring about such a result; but it was the duty of the Master Car Builders' to take action that would help the work along.

Mr. Wall moved to refer to the executive committee the subject of automatic car couplers, with the power to arrange for and conduct a public trial at some central point, to employ one or more experts, and to request the co-operation of the railroad companies in making trials and in furnishing the funds for conducting the same, the executive committee to make report of the results and to make recommendations at the next meeting of the association.

Mr. Davenport wanted to have an authoritative explanation made about the difficulties in coupling when different forms of couplers were used. Unless this were done, there may be serious misunderstanding about the position taken in the matter.

Mr. Adams wished to know if a resolution similar to that under consideration was not passed last year. It was easy, he thougnt, to pass resolutions, but hard to carry out the recommendations made. There have been abundant trials already without leading to the way of agreement. Was of the opinion that the proposed action meant so much more wind.

Mr. Wall read the resolution of last year referred to, and explained that it was not found practicable by the executive committee to carry out the tests. They had now consulted with their railroad managers and were better prepared to act.

Mr. Rhodes expressed the opinion that more would come of recommendations made by the Association this year.

Mr. Cloud favored the resolution. He believed that the future car-coupler would be decided by the process of evolution, and that years would be needed to prove what coupler would be best for all kinds of service.

Mr. Wall explained that his object in making the resolution was to put the matter in the hands of the most powerful committee belonging to the Association. They would be able to deal with it in an authoritative manner.

Mr. Bissell mentioned that all the leading lines were adopting automatic car-couplers, and that every year's delay permitted more to be adopted before action was taken.

Mr. Raymond said the question of the patent part did not weigh for any thing. He called upon the members for a profitable discussion of the subjects by them as mechanics and practical men. The standpoint of a legislator is not the same as yours. They are trying to save life, and the speaker deemed it the duty of the association to show how that could be done most effectually. He did not think it necessary to decide on a single coupler, but said if you, the master car-builders, do not settle the matter in an authoritative way the politicians will do it in a bungling way. He drew attention to the great expense for links and pins alone, and was amazed to find how many inventors were still holding on to the link and pin. The time will come when a machine will be put between the cars that will couple when wanted and will not couple when not wanted. It is for you experts to say what are the elements of the car coupler you want to adopt.

Mr. Adams thought an inaccurate statement had been made to the effect that more people had been hurt since the automatic car couplers were adopted in New England than there were before. He believed such reports to be without foundation. He believed the adoption of a variety of car couplers would result in inconvenience, but there would be no increase of danger.

Mr. Marden wanted a draw-bar with a vertical face that would couple quite easily with other drawheads in use, but he came to the convention authorized to support any drawbar that the Association would recommend.

Mr. Garey believed they would eventually adopt some form of hook coupler because it would be convenient, cheap and easily repaired.

After some further discussion in which nothing of importance was brought out, the resolution was adopted.

SUBJECTS FOR NEXT MEETING.

The Committee on Subjects for next convention recommended that reports be presented on the following topics: 1. British and Continental Practice in Details of Car Construction; 2. Standard Freight Car Trucks; 3. Standard Appliances for the Safety of Trainmen; 4. Automatic Freight Car Brakes; 5. Trap Doors in Roofs of Passenger Cars; 6. Standard Dead Blocks; 7. The Comparative Advantage of the two Methods of Constructing Freight Cars, with and without Platform Timbers or End Sills Projecting from the End of the Car; 8. Maximum Outside Dimensions of Freight Cars; 9. Standard Draw Gear for Non-Automatic Coupler; 10. Appliances to Prevent the Sliding of Wheels with Passenger and Freight Car Brakes.

Mr. Wall gave notice of the following amendments to the constitution, which he will propose next year. 1. Permitting Article X. to be changed so that the assessment may be raised to $8. 2. In Article VIII., section 3, after the word "President," to put in the words "on consulting with the executive committee."

This last amendment, if passed, will take away from the President the power of appointing committees.

The convention adjourned to meet at Niagara Falls on the second Tuesday in June, 1886.

Examination of Railroad Appliances.

After the close of the first day's session of the Car-Builders' Convention, the members proceeded by special train to Newport News, to examine cars placed there for inspection. A freight car designed by Mr. Wall, of the Chicago, Pittsburgh & St. Louis road, attracted considerable attention. The frame of the car-body is built in the form of a double Howe truss, and it is made strong enough to carry 30 tons. Buckling, in case of accident, is provided against by heavy truss-rods. The Wagner door is used on the cars. That door is flush with the side of the car when closed, an arrangement which it is claimed excludes dust and rain.

Several new cars belonging to the Chesapeake & Ohio road were shown equipped with the Titus & Bessinger automatic car coupler, which was subjected to some hard tests of coupling while the cars were being bumped together on a sharp curve, an ordeal they passed through successfully. That coupler is of the kind that couples on a vertical face, and has a cam arrangement for taking up the lost motion. Its efficiency is highly spoken of by the officers of the road. The C. & O. cars have an iron truck, with swing center, the general outline closely resembling that recommended by the committee of the M. C. B. Association as the standard.

Another coupler that was subjected to rather severe tests was the Curtis & Wood, which was attached to a Lehigh Valley Railroad hopper car. This car had the standard Lehigh Valley truck, which Mr. Goodwin recommended for the Association's standard. Many of the members spoke very favorably about this truck when looking over the cars.

The Thurmond coupler, which in many respects has a strong resemblance to the Janney, received considerable attention. The valuable feature claimed for this coupler over others of the same sort is that it has no springs and can be furnished for use without machine work.

The Cowell and Janney couplers were tested with the usual satisfactory results, and several others less known were tried. A friction brake and numerous other novel attachments of the various cars attracted more or less attention.

Revised Rules of Interchange,

CODE OF RULES GOVERNING THE CONDITION OF, AND REPAIRS TO, FREIGHT CARS FOR INTERCHANGE TRAFFIC; REVISED AT FORTRESS MONROE, JUNE 10, 1885.

RULE 1.—Each road is to *deliver* the cars to connecting roads in *good running order*, as defined by the following rules:

RULE 2.—Each road may maintain an inspector at junctions and refuse cars unless they are put in good running order.

RULE 3.—Cars may be refused for any of the following defects:

a. Wheels cracked or broken.

b. Flat spots on wheels exceeding 2½ inches in length.

c. Flanges with flat vertical surfaces extending over ⅞ inch from tread of wheel.

d. Flanges less than 1 inch thick.

e. Wheels chipped on the rim, leaving the tread less than 3½ inches.

f. Axle journal cut, or less than the following diameters: size of journals shall be proportioned for capacity as registered on cars:

60,000 lbs.	(4 axles)	to be not less than	3¾	in. diameter.
50,000 "	"	" " "	3¼	" "
40,000 "	"	" " "	3	" "
30,000 " or less	"	" " "	2¾	" "
60,000 "	(6 axles)	" " "	3½	" "

g. Brakes not in efficient condition.

h. Brake wheels, steps, ladders or running boards not securely fastened or in bad condition.

i. Draw-bars or attachments in bad order.

j. Leaky roofs on merchandise or grain cars.

k. Spliced draw sills or draw timbers.

l. Intermediate timbers or outside sills, spliced in a manner not provided for in the rules.

m. Doors in such a condition as to render them unsafe as protection from fire and storms.

n. The general condition of cars considered unsafe to move in heavy trains.

RULE 4.—In order to give a good dispatch to the movement of cars the inspection by the receiving road and the repairs by the road offering the car shall be promptly made.

RULE 5.—In case a car has defects which do not render it unsafe to proceed on its journey before being repaired, the inspectors shall note such defects, and the car be accepted subject to being received back in the same condition.

In such case a card 4½×6½ inches, in the form shown below, may be affixed under the body of the car, for guidance of other inspectors, preferably on the inside of the cross-frame tie-timber, stating the defects with which the car will be received back, and when the car is so repaired the card shall be removed.

(*Name of Road.*)

Car No. ....Date....

Initial..............................Line....

Will be received at any point on this company's line, with the following defects:

....

....

....

................Inspector at................

Any company finding a car with card on it may make the repairs noted by card, and make bill for the same to the company putting on the card, the card to accompany the bill as voucher for the work done. In making out such bills the charges shall be as follows: Castings, 2 cents per pound; wrought iron, including bolts and nuts, 5 cents; malleable iron, 5 cents; labor, 20 cents per hour, and no percentage shall be added to either labor or material. All cards shall be printed and filled in on both sides.

RULE 6.—Every effort shall be made to cause the least possible hindrance to the dispatch of traffic in the inspection of cars, and the settlement of any disagreements arising thereunder.

In case the receiving and delivering inspectors disagree as to the condition of the car, the case is to be immediately referred to their superior officers.

RULE 7.—Each road shall give to all cars of other roads while on its line the same care as to *repairs*, *oiling* and *packing* that it gives to its own cars, and shall return them in as good general condition as they were when received. Should this not be done, the car may be refused upon its return until it is repaired, or until the company which has used it agrees to pay the expense necessary to restore it to such good general condition. Locks are not to be considered a part of the proper equipment of a car, and if left on the cars when offered to foreign roads it will be at the risk of the owner. The car owner shall be at the expense of replacing roofs lost off cars while in transit, and which upon examination show faulty construction, namely: The ends of the car lines improperly fastened to the plates, tin roofs improperly cleated down, and rotten carlines or plates.

RULE 8.—Wheels and axles used to replace those broken or worn out under fair usage will be charged to the company owning the car.

Wheels with flat spots exceeding 2½ inches in length or diameter, or flanges with flat vertical surface extending more than ⅞ of an inch from the tread of wheel, or less than one inch thick, shall be considered worn-out wheels.

Wheels flatted by sliding or wheels having treads or flanges chipped are not to be considered as worn out by fair usage. Such wheels shall be replaced by the company sliding or chipping them, at their own expense. The condition of each wheel removed must be noted on all bills. All wheels removed for any cause shall be reported to the owner of the car.

RULE 9.—Bills rendered for wheels and axles shall be in accordance with the following schedule of prices for material, with the proper debits and credits:

	New.	Second-hand.	Scrap.
One 36-inch wheel........	$15	$10	$6
One 33 " "	11	8	5
One 30 " " or less..........	10	7	4
One axle..................	11	7	4

and in accordance with the following rates for labor:

Boring and fitting wheels, each, 50 cents.

Turning axles, each, 40 cents.

Drawing and replacing, per axle, 50 cents.

When only one wheel is put on an axle it must be of the same circumference as the other wheel on the same axle, but in no case shall a new wheel be mated with a second-hand wheel.

Prick-punching the wheel-seat or shimming the wheel shall under no circumstances be allowed.

RULE 10.—One railroad company rendering a bill against another for wheels or axles *shall note on the bill*, which shall be of the following form:

....

Address...

To the Pittsburgh, Cincinnati & St. Louis Railway Co., Dr.

For Wheels and Axles used under.............................Cars, Month of ....188....

Date.	Station.	Car.			Wheels Removed.				Shop Marks on Wheels and Axles.	Wheels and Axles used.		Charge.
		Initial.	Class.	Number.	Maker.	Date Cast.	Number.	Cause of Removal.		No.	New or S. H.	

A full and exact description of the mode and manner of failure, name of manufacturer, the date cast and all shop marks as found on such wheel or axle removed, as well as the owner, number, class and line of cars from under which they were taken, with date and name of station at which they are removed. They shall mark on the inside hub of the wheel substituted the date of its application. Bills may be declined until the above information is fully furnished. If no marks or dates are found on wheels or axles removed, a notation to that effect must be stated on bill.

The following terms shall be used on the bills for wheels and axles in noting the defects of wheels that have failed under fair usage:

Worn Flat—Where the flat spot or spots exceed 2½ inches in length or diameter, care must be taken to distinguish this defect from "slid flat."

Worn Flange—Where the flange is less than one inch thick or has flat vertical surfaces extending more than ⅝ inch from the tread of the wheels.

Cracked Plate—This term is to be used in reporting all cracks that may occur in the plate, other than those extending from the wheel-fit towards the rim (caused by bursting). In the report the length of the crack must be given.

Cracked Brackets—The number of brackets cracked must be stated in the report.

Shelled Out—This term is to be applied to wheels which become rough from circular pieces shelling out of the tread, leaving a rounded flat spot, deepest at the edge, with a raised center. No wheel must be condemned for this fault unless the spots are over 2½ inches in length, or their number is so great as to interfere with the safe running of the wheel.

RULE 11.—If an accepted car of another road is injured upon a road it shall be repaired by, and at the expense of, the company in possession thereof as promptly as it repairs its own cars.

Such repairs shall be permanently and thoroughly made, and shall conform to the design in detail of the original construction (provided the same can be determined from the car itself), and with the same form and quality of material originally employed.

The companies may, however, agree with each other to substitute for broken parts new standards, such as the axle-bearing and box adopted by the Master Car-Builders, improved draw-bars, etc.

RULE 12.—Sills broken or materially injured must be replaced by new ones of the same size and of good quality, an exception to be made of the intermediate and outside sills to which the draw timbers are not attached, which may be spliced once with a "ship splice," as here shown (cut omitted), of 24 inches in length, and secured by three ⅝-inch bolts, the ends of the splice to be not less than 12 inches from the bolster, all to be done in a workmanlike manner

RULE 13.—Any company departing from the above rules without authority shall be liable for the cost of changing the car again to the original standard. The car may be refused until the changes are made or an agreement entered into to send it to the owner for such alterations, in which case proper credit shall be given for the material removed.

RULE 14.—Companies shall promptly furnish to each other, upon requisition, and forward free over their own road, standard materials for the repairs of their cars injured on foreign lines. In such cases the following prices may be charged:

a. Iron castings, 2 cents per pound.

b. Brass journal bearings, 18 cents per pound.

c. Malleable iron, 5 cents per pound.

d. Phosphor-bronze bearings, 20 cents per pound.

e. Forgings, bolts and nuts, 5 cents per pound.

RULE 15.—When either car-trucks or bodies are destroyed on a foreign road, the owners must be notified immediately, that a settlement may be speedily effected.

The company destroying the same shall have its option whether to rebuild it or pay for the same at the established price.

If only the body of the car is destroyed and the company destroying it returns the trucks, they shall be delivered to the nearest point on the road of the company owning the car, free of charge.

If it elects to pay for it, a deduction shall be made by the owner for the depreciation of the car-truck or body at the rate of 6 per cent. per annum upon the yearly depreciated value of the parts destroyed since last built: Provided, however, that such allowance shall in no case exceed 60 per cent. of the established price.

Until further revision of these rules the prices for settlement under this rule shall be as follows:

Eight-wheel box car, 33 to 35 feet long	$450.00
" " " " 32 feet long or under	430.00
" " cattle car, 32 feet long or over	450.00
Eight wheel ordinary stock car, 32 feet long or under	425.00
" " gondola car, 20-ton drop bottom	400.00
" " " coal car, 20 ton hopper bottom	450.00
" " gondola 31 feet long or over	350.00
" " ordinary gondola car less than 31 feet long	300.00
" " ordinary flat car, 31 feet long or over	300.00
" " ordinary flat car, under 31 feet long	300.00
Four " gondola car with truck and drop bottom	305.00
" " box car	230.00
" " ordinary coal car	205.00
One pair 4-wheel trucks	200.00

RULE 16.—If the company destroying the car elects to rebuild it, no allowance shall be made for betterment. In such case the car-truck or body shall be rebuilt by and at the expense of the road destroying it, upon the same plan and of the same kind and quality of materials as originally constructed, within sixty days.

RULE 17.—Running repairs, namly: Such parts as fail under fair usage or require frequent renewals from wearing out or failure resulting from faulty construction on cars belonging to private parties shall be paid for by the parties ownieg the car. This not to include cars bearing the initials of any railroad company, and all railroad companies shall have the same responsibility to the companies for all charges for repairs to leased cars which are marked with their names or initials, as they would for cars owned by them and so marked.

RULE 18.—When a car is damaged or destroyed on a private track, the railroad company delivering the car upon such track shall be subject to the same responsibility as if the damage or detention had occurred on its own track.

RULE 19.—Any railroad company may become a party to this code of rules by giving notice through its general manager or general superintendent to the President of the Master Car-Builders' Association of its adoption of said code of rules for one year, beginning with the date on which said rules take effect.

RULE 20.—These rules shall take effect after Aug. 1, 1885, and shall be introduced for discussion and revision during one session of the Master Car-Builders' Convention of each year.

RULE 21.—The Executive Committee of the Master Car-Builders' Association shall receive and consider all changes, amendments and additions to these rules which may be proposed to them during the year, and shall report all such proposals to the Association at the time of the annual revision, with recommendation for adoption or otherwise.

The following motion was then carried: That the Executive Committee shall present at the next annual meeting a codification of the rules for interchange of cars, embodying such amendments thereto as may be presented during the year, and adopted by the committee.

Communications.

Relative Economy of Good and Poor Wheels.

To the Editor of the National Car-Builder:

The figures regarding the life of car wheels given by Mr. Wilder at the last meeting of the Car-Builders' Club, in New York, have astonished many old railway men as well as many manufacturers of car wheels. There is danger, however, that these figures will be misunderstood by the railroads, and that wheel-makers will still be obliged to make poor wheels, in spite of the general desire among them to produce a better wheel. The roads, generally, wish to buy a good article, and in this they are no doubt honest, but the wheel-maker finds that railroad officers are unconsciously influenced by the prices paid for poor wheels. The purchaser says, "there are wheels in the market for $6 or $7." "Now if I pay two or three dollars more than this, I ought to get a good wheel." In this way the poor article gauges the price of the best, without any real comparison being made between them.

Even with this allowance as a difference in price, a wheel that will be profitable to the purchaser cannot be manufactured. As the makers of the poor wheels lower their prices, the effect is felt by those makers who use first-class iron. Mr. Wilder's figures give a basis for estimating the value of a wheel costing $10 or $11 compared with one of the cheapest class which can be purchased for, say, $6.

The figures show that the best wheels were removed for breakage to the extent of a little more than one in 300, or ⅓ of one per cent.

The poorest wheels in use were taken out at the rate of 1 in every 4. In other words, one wheel was worth 75 times as much as the other, and if the poor wheel was worth the $6 paid for it, the good wheel ought to bring $450. Or, reversing the matter, when the good wheels are sold for $11, the poor ones ought to bring from thirteen to fourteen cents each.

Even these figures, large as they are, do not show the actual difference between the two classes. To obtain from the cheap wheel the same mileage as that guaranteed by the best makers, a large number would be called for. Against each of these should be charged the cost of fitting and putting under the car, say $1.50 or $2, according to the schedule adopted. A glance at the figures shows that no road could afford to use the cheap wheels, even though furnished free. Supposing that ten of these wheels would run so as to make 40,000 miles, which they certainly could not do, the cost of fitting them up and putting under the cars would amount to from $15 to $20. The expense of a given number of miles run with them would be many times greater than with a good wheel which could perform the same service. Figured on the basis of the number of miles per dollar, the results are quite as striking, and the balance against the poor wheels fully as large. When a wheel is guaranteed to run 40,000 miles, and costs $9, the price per mile under the guarantee is .000225, or a trifle more than ¼ of one mill. The poorest wheels mentioned by Mr. Wilder would cost .0169, or more than 1½ cents per mile.

Taking some of the best of the cheap wheels, the relative figures will show a cost of .0034 per mile, or a fraction more than ⅓ of a cent. Variations in the prices of good and poor wheels change the figures but very little. The fact still remains that the best of the poor wheels is worth, for the purpose of a car wheel, less than its actual value as scrap. When a $9 wheel makes a mileage of 40,000 miles, the best of the second-rate wheels mentioned by Mr. Wilder should bring about 60 cents in order that first cost per mile of running may be the same. As in the former cases the cost of replacing is not taken into account. While the facts given by Mr. Wilder show clearly the enormous difference between the poor and the first-class wheels, it must be remembered that these figures are based on the one item of breakage. The common experience of Eastern roads points to the fact that the difference in wear is quite as great as that in breakage.

With these figures as a guide, it is to be hoped that the difference in price between good and poor wheels may be made much greater than it is at present, or, better still, the worthless wheels may be driven entirely out of the market.

It hardly appears probable that the railroads will long rest satisfied to pay such heavy prices for worthless articles. To spend $6 for an article which at current market rates should be sold for 60 cents, is a kind of swindle that no business man will endure. I hope the ventilation which the subject has received will attract sufficient public attention to cause the evil to be remedied. A. H. M.

THE Manhattan Elevated Railroad Company, of New York, have experienced considerable trouble ever since the road was opened, with their locomotive cabs shaking to pieces or rotting out. The life of a good wooden cab seldom exceeded five years. The mechanical department has recently designed an iron cab from which great durability is expected, and several of them have already been built at the company's shops. No. 12 sheet iron is used for building this cab, and it is stiffened with angle irons. Wood is not used in this cab at all, except for framings to hold the windows. Formers have been made for bending the sheets on to the proper shape, and templets have been prepared for laying the sheets out on. The intention is to supply all engines with cabs of this description as fast as renewal is necessary.

A Large Pile-Driving Machine.

To the Editor of the National Car-Builder:

The Central Railroad & Banking Co., of Georgia, have just completed a pile-driving machine designed especially for doing very heavy work. It was built at the company's shops at Augusta, Ga., under the immediate supervision of Mr. Thos. F. Warwick, the master mechanic. The following description will no doubt prove of great interest to railroad men, and particularly those interested in this class of machinery. The machine rests upon a platform car constructed especially for this purpose. The car is 10 feet wide by 44 feet long. There are eight heavy longitudinal timbers, 12 inches deep, running full length of car, and are capped with heavy oak end sills.

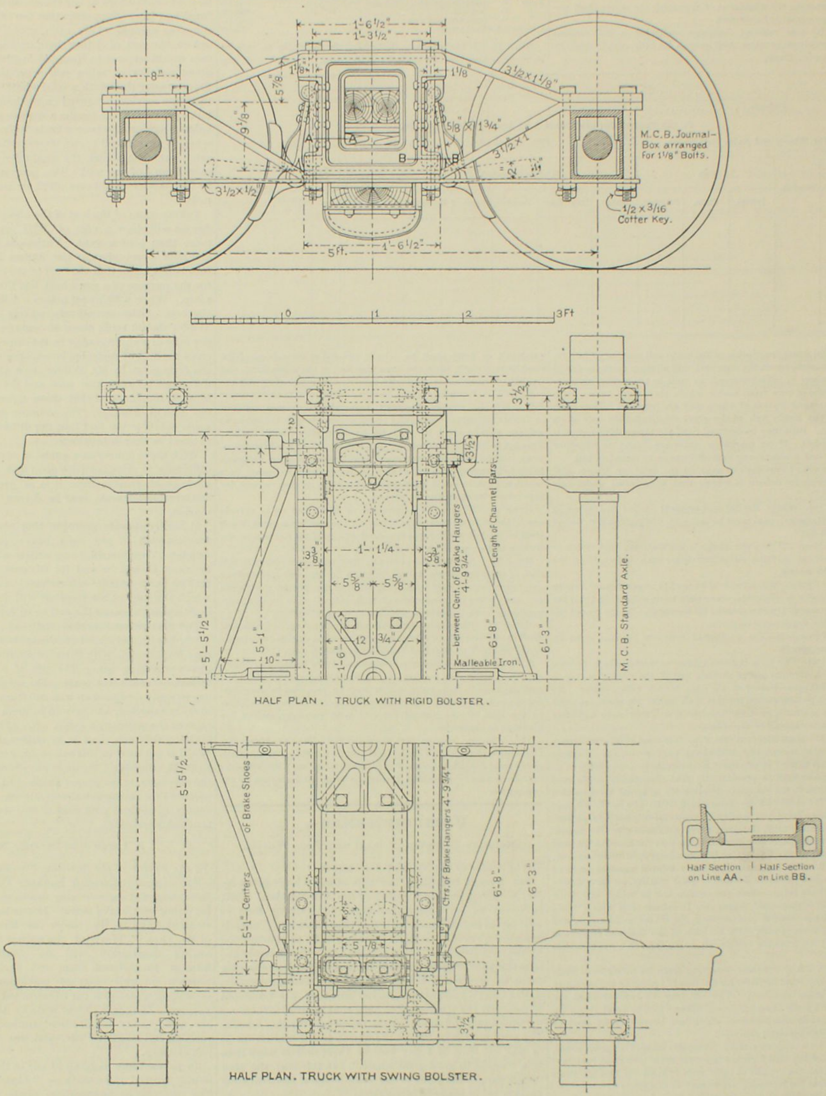
To prevent any sagging of car in the center, the car is doubly trussed underneath on "Fink" plan of trussing. The transoms or bolsters are made from pieces of flat iron, 1 by 6 inches, with tension rows transverse of car to prevent four sides of car from sagging. Three of these transoms are introduced, so that front truck may be run back under car to allow car to reach forward to drive trestle bents 12 feet apart. This platform rests upon two massive four-wheeled trucks of the heaviest pattern known, the bars alone being 1½ by 4 in. wide. Wheels are heavy double plate pattern. Axles and boxes are Raoul's patent. Journals are 4½ in. diameter by 8 in. long, without collars. Six heavy half elliptic springs are put under each bolster. Side leveling screws are put upon each side of trucks, so that car can always be brought to a level in the manner of a surveyor's level. This is believed to be the heaviest platform car ever built, it weighing alone 32,000 pounds.

The leaders to hammer are 40 feet high, and will take in a pile 18 inches square by 30 feet long or 50 feet long, over an embankment or waterway. Piles can be driven until they are 18 feet below the level of track—a valuable feature when working at a washout.

The framework and leaders are very strongly built,

PROPOSED STANDARD FREIGHT CAR TRUCK.

Reported by Committee of Master Car-Builders' Association. (See page 87.)


1'-6 1/2"
1'-3 1/2"
8"
1 1/8"
5/8"
9 1/8"
3 1/2 x 1 1/8"
5/8 x 1 3/4"
3 1/2 x 1"
3 1/2 x 1/2
A
B
M.C.B. Journal-Box arranged for 1 1/8" Bolts.
1/2 x 3/16" Cotter Key.
5 ft.
1'-6 1/2"
0 1 2 3 Ft
3 1/2"
1'-1 1/4"
3 3/8"
5 5/8"
12 3/4"
5'-5 1/2"
5'-1"
10"
1'-6"
Length of Channel Bars
between Cent. of Brake Hangers 4'-9 3/4"
6'-8"
6'-3"
Malleable Iron
M.C.B. Standard Axle.
HALF PLAN. TRUCK WITH RIGID BOLSTER.
5'-1" Centers of Brake Shoes
Ctrs. of Brake Hangers 4'-9 3/4"
5 1/8"
Half Section on Line AA.
Half Section on Line BB.
HALF PLAN. TRUCK WITH SWING BOLSTER.

being trussed and bound with heavy plates of iron. One of the principal and most useful features of the whole machine is the novel manner in which main leader frame and stem hammer are raised and lowered from vertical to horizontal positions. This is an ingenious device of Mr. Warwick's, effecting a great saving of time and labor, also possessing many advantages over the old way. The whole framework of leaders rests upon a pivot just below the center, and is held to place by an automatic latch which holds it securely whether in vertical or horizontal position. To raise the leaders, the hammer is slid out (by steam power) to a nice balancing point, the latch is loosened and the weight of hammer swings the leaders to a vertical position without noise or jar, where the automatic latch holds it. To lower frame, hammer is raised so as to counterbalance, latch is unfastened, and leaders swing to horizontal position without noise, being under perfect control of the engineer at all times.

The entire framework rests upon a circular turn-table track provided with gear teeth, and is operated with a pinion and worm; one man being able to move it easily to right angles to the track. Pinion and worm act as a lock to prevent frame from moving while at work. A hand-brake is also provided, so that car is under perfect control at all times. The steam hammer is what is known as the Nasmyth steam hammer. It will strike about 75 blows per minute at a steam pressure of 100 pounds. It weighs 8,000 pounds. Hammer is raised and lowered by a 40 horse-power engine, built especially for this machine by the Lidgerwood Manufacturing Co., of New York. It combines all the latest improvements. Steam is supplied by a locomotive detailed to accompany this machine. Steam pipes are 3 inches internal diameter, and pass under engine, tender and car and come up through center-plate of turn-table, so a perfectly tight steam joint is kept while machine revolves. A heavy steam hose conveys steam to hammer, having an internal diameter of 2¼ inches and accompanies the hammer when raised or lowered.

Every convenience to facilitate the working of the machine is provided.

The entire weight of machine is 71,000 pounds, 45,000 pounds of which rests upon front truck when at front end of car; but when front truck is placed back in second position, then total weight resting upon front truck is 58,000 pounds. The Master Car-Builders' Association, when in convention and discussing heavy loads upon trucks, would do well to investigate this.

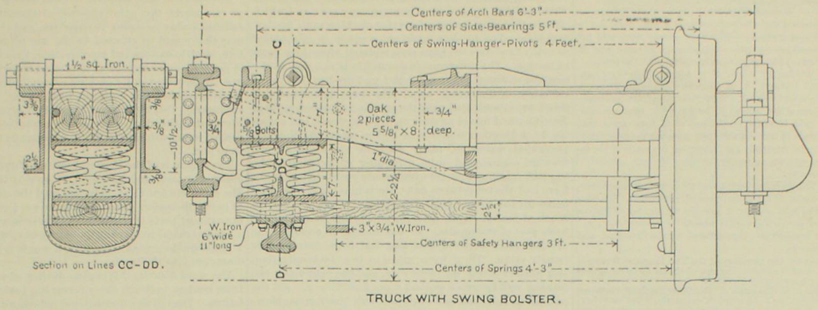
Living cars for the hands are provided, making a complete train consisting of four cars and locomotive. Do not know of any other road in the South that has a complete train equipped for this especial purpose. The average working capacity is about 40 piles per day. Time occupied in driving and setting a pile is about 10 minutes.

Mr. Warwick has named this machine "Colossus," and the machine being built upon so large a scale, we think the name very appropriate.

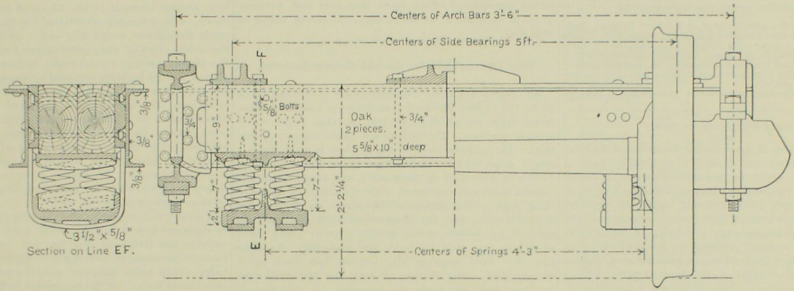
H. B. G.

PROPOSED STANDARD FREIGHT CAR TRUCK.

Reported by Committee of Master Car-Builders' Association. (See page 87.)



TRUCK WITH SWING BOLSTER.



TRUCK WITH RIGID BOLSTER.

Driving Wheel Remover and Replacer.

To the Editors of the National Car-Builder:

I notice in the CAR-BUILDER for June an arrangement for removing and replacing the driving wheels of locomotives, which has been patented by Mr. Vreeland, M. M. of the N. Y., L. E. & W. shop, at Jersey City. The device as illustrated in your paper was designed by Mr. William Stamp, General Foreman of Erie Railway shops, at Susquehanna, Pa., in 1866. Mr. Stamp submitted the plans to Mr. Minot, who was then General Superintendent of the road, and who consented to have two of the lifting jacks put in the Susquehannah roundhouse, but objected to having the arrangement for moving the wheels sidewise after being lowered, and elevating to a side track as laid down in his plan.

Mr. Stamp is an old and valued employé of the Erie (now New York, Lake Erie & Western) and it is in justice to him that this is written, for the improvements and facilities for doing work economically that he has introduced, have saved thousands of dollars for that company.

C. O. V.

Boston & Albany Railroad Shops.

Most of the railroads with mechanical headquarters in Boston have suffered badly from want of room. Facilities that were deemed ample to meet early requirements have now become utterly inadequate to handle growing business, and in too many cases extensions cannot be made without paying enormous prices for surrounding property. Owing to these facts, nearly all railroad machine shops in Boston are crowded into limited space that admits of no proper arrangement of machinery, and most of them are badly lighted and ventilated. The shops of the Boston & Albany Railroad are a notable exception in this respect. There is no superfluous space around, but the shops are of modern construction, well arranged and provided with every facility for getting out work quickly at the lowest cost. Few shops are so well supplied with conveniences for promoting the comfort and cleanliness of the workmen; and there are numerous labor-saving appliances designed by Mr. Colby, master mechanic in charge. The tool room is particularly worthy of attention, for it contains a collection of tools and gauges such as few railroad shops possess, and they are kept in admirable order.

During a recent visit to these shops we found that they are building three four-wheel switching engines, and two eight-wheel passenger engines. This, with their current repair work, keeps the shops quite busy, compared to the business being done in railroad shops generally. The engines are very plainly and substantially made, and those of the same kind already in service have been famous for their high mileage without repairs. The boilers of the eight-wheel engines are made to carry safely steam pressure of 160 pounds to the square inch. They are made entirely of Nashua steel, the outside shell, which is 52 inches diameter, being 7-16 inch thick. There are 221 tubes, 11 feet long. The fire-box is 68 inches deep, 72 inches long, and along with the tubes gives 1,270 square feet of heating surface. Mr. Underhill is convinced that the marked economical operating of these locomotives is due, in a great measure, to the high steam pressure carried. To prevent slipping the wheels, with the increased power transmitted from the cylinders, he uses Waterman's automatic traction increaser, which throws part of the tender's weight upon the engine by means of the draw-bar arrangement. The device gives entire satisfaction on this road, and effects material saving on the wear of tires.

In the shop we observed a very simple and ingeniously devised device for lifting wheels and other work on to the tools. It is an elongated rod, operated by a piston working in a long cylinder placed under the floor. The rod has an arm attached which connects to the wheel or other work lying on the floor. On turning a handle steam is applied, which raises the arm to any desired height; then it is swung round and the work put in position. There are also several circular tracks placed above heavy tools for carrying a movable hoist that handles the work with little expenditure of manual labor.

They are making iron tender frames in these shops that are as simple and strong as anything we have seen in that line. Channel iron is used, and the bending is done on a former which makes all frames alike. Templets with hardened bushings are used for drilling all holes. This is so well done that the pieces are made without any regard to the particular frame they are going into. The trucks used for the tenders are also made of iron, with a plain flat bar of steel for a brake beam. This is made from worn-out tires. Mr. Colby has recently made some changes on his tender coupling, which makes it couple easily on the the sharpest curves.

Steel and Iron Axles.

In England, statistics showing the breakage of driving axles are kept with care, and the published statistics include crank and straight axles as well as those having hooped webs and those without. The figures are especially interesting, as they show not only the great advantages of steel over iron, so far as strength is concerned, but also that the outside cylinder engine is much easier on its axles than those having inside connections. Exactly the reverse of this position is taken by one of the gentlemen by whom the figures have been arranged. His error appears to arise from a misinterpretation of his own figures and an erroneous method of computing the percentages. The following table shows the number of crank and straight axles and the percentage of breakage in both iron and steel:

Kind of axle.	In use.		Broken while running.		Taken out in shops.	
	Iron.	Steel.	Iron. P. cent.	Steel. P. cent.	Iron. P. cent.	Steel. P. cent.
Crank axles (without hoops)	2,867	4,733	3.1	0.9	6.0	3.8
Crank axles (hooped).	4,121	1,222	0.85	0.9	7.7	0.7
Straight axles (outside cylinders)	438	1,467	5.0	0.5	2.7	0.8
Total............	7,426	7,422	....	....	....	....

It appears that a trifle more than half of the 14,848 driving axles in use were of iron. Of the straight iron axles 2 per cent. failed on the road, while but $\frac{8}{10}$ of 1 per cent. of the steel axles were broken in running. Of the whole number about three times as many iron as steel axles were taken out in the shops, the total number amounting to 9½ per cent.

The number of straight iron axles in use is very small, and amounts to less than 3 per cent. of the total. The percentage of these axles which failed in running was 60 per cent. more than that of any others. As 22 axles gave out on the road, while but 12 were removed in the shops, the conclusion might be reached that as a rule these straight iron axles were too light for their work.

Of the straight steel axles but ½ of 1 per cent. failed while running, and only $\frac{8}{10}$ of 1 per cent. had to be removed in the shops. Adding the 22 iron axle failures to the 8 failures of steel axles, we find the percentage of straight axles on outside connected engines broken while running was but 1.6 per cent. of the whole number in use. In the shops 12 each of iron and steel appear to have been removed, which is as near as may be 1¼ per cent., making the total removals of the straight axles amount to but 2.9 per cent. This is much better than the record of the crank axles, yet the gentleman to whom we referred, with these same figures before him, came to the conclusion that the straight axles failed to the extent of 5.5 per cent. on the road.

Mr. CHAUNCEY M. DEPEW, Second Vice-President of the New York Central & Hudson River road, has been chosen President in place of James H. Rutter, deceased. Mr. Depew is widely known as a lawyer, and to some extent as a politician. He has been connected with the road a long time as a director and counsel, and is thoroughly familiar with its affairs.

The Protection of Railroads against Inferior Car Wheels.

This subject was discussed at the May meeting of the New England Railroad Club.

Mr. W. W. Snow (Ramapo Wheel & Foundry Co.) read a paper in which he maintained that the best cast-iron wheels could not be produced for less than about $12, and when wheels were sold for less than this amount the material composing the mixture was reduced by the use of inferior stock to correspond with the price.

Messrs. J. W. Marden (President), F. D. Adams, John Coughlan, F. M. Curtis (Old Colony), J. B. Fletcher (National Dispatch Line), W. W. Snow and Geo. F. Cochnower urged the necessity of earnest and immediate action to procure the most durable wheels. It was said, however, surprising as it may seem, that some of the railroads in this country had adopted the practice of buying cheap wheels, especially for supplying the needs of the interchange service, and the authority for this statement seemed to be beyond controversy.

In the light of this startling fact it was thought that some remedy should be resorted to for the purpose of protection. In relation to the New England makers, it was said by Mr. Snow that he thought they were producing a good wheel.

The following resolutions were offered by the President and unanimously adopted:

"*Resolved*, That we, the members of the New England Railroad Club, deprecate and condemn the use of cheap or poor wheels under cars run in interchange service.

"*Resolved*, That it is the sense of the New England Railroad Club that there should be a standard wheel made of the best charcoal iron, of uniform size and weight, for use in interchange service, and we would respectfully recommend to the Master Car-Builders' Association that measures be taken at once to secure its adoption.

"*Resolved*, That it is also the sense of the New England Railroad Club that any road replacing a defective wheel with a new one, as provided for under rules Nos. 10, 11 and 12, for the interchange of traffic, shall do so, giving the same guarantee which they procure or which is allowed to them by the manufacturer of said new wheel. The guarantee should cover a period of not less than three or four years."

The Club then adjourned to the fourth Wednesday in September.

Crude Petroleum as Fuel.

Mr. A. J. Stevens, General Master Mechanic of the Central Pacific Railroad, has devised a method of burning crude petroleum which he uses in the furnaces of steamers belonging to the road and for the stationary boilers in the shops. A heavy brick arch, not unlike the ordinary locomotive fire box arch, is built in the furnace and the grate is covered deeply with a bedding of broken fire brick. The petroleum is injected into the space between the arch and bed of broken brick, where it becomes gaseous, and meeting a supply of air, admitted by the proper appliances, is consumed. Two steam jets, resembling injector nozzles, force the petroleum into the furnace through the back of the shell. All the details for regulating the supply of combustibles and air are admirably arranged.

Respecting the apparatus Mr. Stevens writes us: "The apparatus works first rate. We are running our large ferry boat 'Solano,' probably the largest boat of the kind in the world, and other steamers successfully with the fuel burned in this way. We are burning refuse or residuum petroleum, and we have not experienced the slightest difficulty in keeping up steam, in fact we have much more steam now from the boilers than when we were burning coal. I do not know that to you there is anything particularly new in my arrangement, but I have never seen anything of the kind, and it seems to me that this apparatus is about what is required. We find the oil about 50 per cent. cheaper than coal. We can get up steam on a boiler with cold water in about thirty minutes, and the facility with which the oil is handled for fire makes the use of this kind of fuel very desirable on steamers. The fire can be entirely stopped or lighted in all the boilers in a few seconds.

Boston & Lowell Railroad Notes.

During a recent visit to Boston, while looking round the shops of the Boston & Lowell Railroad, we were struck with the handsome appearance of two large Rhode Island locomotives used for the heavy express passenger service of the road. The master mechanic, Mr. Kolseth, said the engines were as efficient as they were handsome, and invited us to make a trip on one of them to Lowell, to see how she could handle a heavy train. We willingly accepted the invitation. The engine cylinders are 18 × 24 inches and the driving wheels 72 inches in diameter. Balanced valves, automatic oilers, extension front, brick arch and all the most improved appliances that contribute to the efficiency of a locomotive are used on these engines. The engine coupled on to a train of fourteen passenger cars, about the half of them being sleepers, and proceeded to take it to Lowell 25½ miles distant in 48 minutes, making two know-nothing stops on the way. Out of Boston there is a long grade of 45 feet to the mile, yet within three miles after starting the engine had that exceptionally heavy train running at the rate of 50 miles an hour. Speed was made on the grade with the engine cutting off at ten inches; but when the level track was reached the engine had no difficulty in maintaining a speed of about 50 miles an hour with the lever in the eight-inch notch.

In the machine shops at Boston they are building some new iron tender frames, to be carried by iron trucks with swing center. The tender frame is of channel iron 6 by ⅜ inch, stiffened by wrought iron braces, and strengthened by the center castings, which extend over the whole frame.

A Durable Fire-Box.

Mr. O. Stewart, superintendent of motive power of the Fitchburg Railroad at Boston, is rebuilding a locomotive that has been in use for twenty-seven years, and which during that long period of service used the same fire-box and flues. The fire-box taken out was not so dilapidated as many fire-boxes we have seen replaced after three years of service. The difference in durability is not due to the superior material of the old boiler and fire-box, but to the character of the water used. The pure soft water that flows uncontaminated over the granite and gneiss rocks of New England leaves no scale on fire-box sheets, and a multitude of disorders common to boilers using the lime-impregnated waters of many districts are avoided. Mr. Stewart enumerated quite a number of locomotives he has still running that are over twenty years old and never have had the tubes taken out. He is making a new steel boiler for the engine he is rebuilding. There will not be much of the old engine left, for new cylinders and wheels form part of the repairs. In the course of repairs some driving axles were removed that had been running over twenty years. They were taken to the blacksmith shop and worked down into side rods, and the man doing the forging said he never worked more ductile iron. All the engines on this road are equipped with the Ashton blow-back valve and Mr. Stewart says its presence has an astonishing educational effect upon engineers and firemen. There is no waste of steam through the safety valves on that road.

New Locomotives for the Old Colony Railroad.

Mr. James N. Lauder, Superintendent of Rolling Stock of the Old Colony Railroad, is making the boilers for three locomotives on which he intends carrying steam of 175 pounds pressure. The boilers are made entirely of Otis steel. The outside shell of the fire-box is made from a single sheet which reaches from mud-ring to mud-ring. Crown-bars are used on the fire-box, and as additional precaution they are connected with the shell by means of sling stays. The circumferential seams are lapped and double riveted, and the longitudinal seams butt, and are secured by double welts double riveted. Two rows of rivets are used to hold the mud-ring. As these are the first engines Mr. Lauder has built since he proposed using double riveting for the mud ring, he has lost no time in reducing his theories to practice. An extended smoke-box provides the spark-arresting appliances, and the Pennsylvania style of brick arch will be placed in the fire-box. Mr. Lauder believes that the exhaust-pipe rising up through the centre of the smoke-box has an injurious effect upon the draft from the tubes, and he has devised a plan for these engines which brings the exhaust-pipes out at the sides inside the smoke-box, and they are led round close to the shell and join in a single nozzle near the base of the stack. The engine truck pedestal jaws, and axle-box rubbing surfaces are chilled. The tender truck is entirely of iron, two heavy channel bars riveted to an end casting making a strong, simple and inexpensive transom.

The engines will have cylinders 17 × 24 inches, and driving wheels 63 inches diameter. Links of 72 inches radius are used, and the valves are balanced by the Richardson device. All the steam connections are taken from a single stand in the cab, which is provided with an automatic valve that will close the opening in case of accident.

Enormous Passenger Traffic.

Over 1,650 trains pass over the junction of the New York Elevated railroads at Chatham Square every twenty-four hours. No railroad in the world does an equal train business on two tracks. There is a junction in London where 2,400 trains pass daily, but four tracks are provided for their accommodation. At certain hours of the day the New York Elevated railroads are worked almost up to their full capacity. Improved terminal facilities will increase the means of handling traffic to a considerable extent, especially on the north end of the Third Avenue line. If the company were now compelled to adopt an absolute block system, which would keep the trains a certain distance apart, they could not handle the business now done on two tracks.

The only railroads in operation that compare with the New York Elevated railroad system for crowded business are the London Underground railways. The Underground railways carry an enormous number of passengers, and the traffic has developed very rapidly, In 1879 a total of 91,420,178 persons were carried by the London Underground railways, while in 1884 the number had increased to 114,447.514. During the corresponding five years the New York Elevated railroads showed an increase from 46,045.181 to 96,702,620. While London still remains a good distance ahead in the grand totals, as it does in population, the ratio of increase was largely in favor of the American metropolis; in other words, while the Underground showed an increase of 23,027,336 in five years, the Elevated had expanded its figures by 50,667,430, at which rate it will not take New York long to catch up with London.

Work of Operating Elevated Railroad Trains.

BY ANGUS SINCLAIR.

So much has been said and written during the last year or two about the great expense of operating suburban railroad trains by steam locomotives, and about the economy that might be effected by the use of pneumatic motors, electric motors and rope traction, that I determined, if possible, to make careful tests that would demonstrate exactly how wastefully or how economically steam locomotives performed work of this kind. Through the kindness of Col. Hain, general manager of the New York Elevated Railroads, I was recently permitted to make the desired tests, with Engine No. 2, running on the Third Avenue line.

The engine is of the Forney type, weighing, in working order, 21½ tons, and has been in service three months. The cylinders are 11 × 16 inches and the driving wheels 42 inches diameter. The steam ports are ⅞ × 8 inches and the exhaust ports 1¾ × 8 inches. The exhaust passes into a hemispherical receiver in the smoke-box, which contains a noise-muffler, thence through a single nozzle, 4 inches diameter, into the stack.

The work done by this engine during nine round trips from Harlem to South Ferry forms the basis of the calculations. During two double trips, indicator diagrams were taken between most of the stations. Mr. John D. Campbell, general foreman of the Elevated Railroad Machine Shops, who arranged everything for the trial, took the cards during one round trip and I took them during the other. Out of sixty cards taken, I selected twenty of the closest average I could make, and sent them to be engraved, but the building occupied by the engravers took fire few days after the diagrams were sent in, and half of them were lost. The ten diagrams published represent a trip from Harlem to South Ferry. Those burned showed the work done by the engine in going from South Ferry to Harlem. The indicated horse-power of each card was worked up before it was sent to the engraver; and the power developed by the engine going each way was so nearly the same, that the preserved diagrams present a good average record of the work.

A good many engineers who examine the diagrams will be surprised to find that so much work is expended in running the trains on the elevated railroads. Serious miscalculations have been made by engineers who ought to have been better informed as to the power required to move those trains. If the locomotive had nothing to do but get the train up to its average speed of fifteen miles an hour and keep it going at that velocity, the work would be very light. But that is not the way the work is done. During the run of 8½ miles from Harlem to South Ferry, the train makes twenty-five stops, and the trip is made in forty-two minutes. The work done by the engine is a succession of twenty-five spurts, when the train is forced rapidly from a state of rest to a speed of about twenty-five miles an hour, then suddenly brought back to rest by the action of the brakes. The operation of the locomotive pulling one of these trains strikingly resembles the recurring work done by the engine of a pile-driving machine, which is constantly raising a heavy weight that is suddenly dropped and has to be raised again. If the Elevated Railroad trains were run through without making stops, they could be operated with a draw-bar tension of about eight or ten pounds per train ton, but the conditions under which they are moved require a draw-bar tension of about 40 pounds per train ton to be maintained while the engine is using steam.

Several writers who have lately been trying to instruct the public about how to operate suburban and city railroads economically, have fallen into the serious error of basing their calculations of train resistances on the traction needed for running trains through without stopping. In that way they obtained merely about one-seventh of the required power; and there is good reason to believe that parties are planning, what they suppose to be improved methods for running trains, on the erroneous basis described.

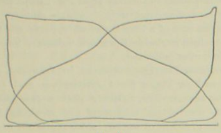
The track throughout the whole length of the Third Avenue line is undulatory, with several grades over 100 feet to the mile. There is less than one mile of level track on the whole line, and engines pulling trains do not here, as on a surface undulatory road, receive the benefit of the momentum gained going down a hill to help the train up the succeeding grade, for the stops are so frequent that all benefit from that source is lost.

Leaving Harlem, the track ascends 8 feet per mile for half a mile, then descends 16 feet to the mile for another half mile. Then comes an ascent of 105 feet to the mile for 3,300 feet, which is succeeded by 1,500 feet of a level, then 1,300 feet of a descent at the rate of 95 feet to the mile. Another short level is again reached, to be succeeded by an ascent of 100 feet to the mile, followed shortly afterward by a descent of 80 feet to the mile. So it goes all through the profile, a variety coming in when the lower part of the city is reached, in the shape of several very sharp curves.

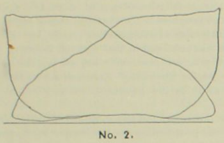
The train pulled over this road consisted of four cars which according to the official records of the road have an average weight of 23,850 pounds each. Taking the average load of passengers at 170 each, weighing 130 pounds, we have a total train weight, including engine, of about 80 tons to be moved. An examination of the indicator diagrams will show that the mean effective pressure in the cylinders

Indicator Diagrams from Manhattan Elevated Railway Engine, No. 2—Indicator Spring 60 *Pounds to the inch —Half Scale.*

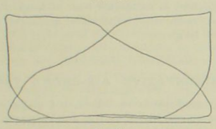
Number of card.	Boiler pressure. Pounds.	Revolutions per minute.	M. E. P. Pounds.	I. H. P.
1	130	136	87.18	90.66
2	131	104	83.55	66.4
3	123	144	87.45	96
4	124	144	63	67
5	125	174	82.87	110
6	125	140	63.9	67
7	125	156	84.9	101.3
8	127	72	85.5	47
9	130	96	94.95	67
10	125	168	82	105



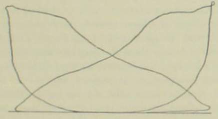
No. 1.



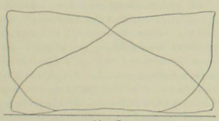
No. 2.



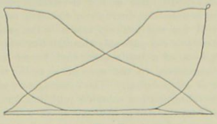
No. 3.



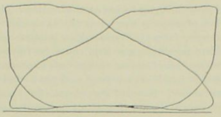
No. 4.



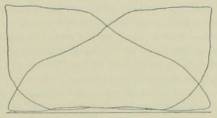
No. 5.



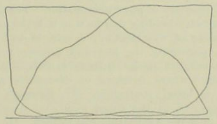
No. 6.



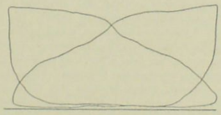
No. 7.



No. 8.



No. 9.



No. 10.

was 81.5 pounds. According to the well-known formula $\frac{d^2 L p}{D} = T$, this gives a total tractive force of 3,759 pounds. Deducting 10 per cent. for loss from friction, we have 3,384 pounds remaining available for moving engine and train, a force a little over 42 pounds per gross ton.

The ordinary way of operating the locomotive, is to start with the reverse lever in full gear, hook up, after about ten or twenty revolutions have been made, to the sixth or seventh notch, and get back to the eighth notch when full running speed is attained. The latter notch is seldom reached. The throttle is generally kept well out most of the time, so that there is little loss from throttling. All the diagrams except 4 and 6 were taken with the reverse lever in the seventh notch, where the average work of the engine is done. Cards 4 and 6 were taken in the eighth notch, the former on level track, the latter on a descending grade. These two diagrams show an excellent distribution of steam, and could the trains be run so that the average card would be of that character, few engines would do their work so economically as the locomotives on this road. The remaining diagrams were taken when the engine was doing its representative work forcing the train into speed, sometimes on grades, at other times on track nearly level. There was little difference in the character of the diagrams taken, whether on grade or level track, the difference alone being that in the latter case speed would increase quickly. On a grade a high steam line would be needed to keep up speed, while on a level the same high steam line would be used and the margin of power put into accelerating the velocity of the train.

The average horse-power developed, as shown by all the diagrams, was 81.7, which, for the two cylinders, makes 163.4 indicated horse-power. During the trip, occupying 42 minutes between the termini, the engine used steam only for 20 minutes. The average power therefore used in moving the train the whole distance would be $\frac{20}{42}$ of $163.4 = 77.8$ horse-power. To move trains by continuous power, such as rope traction or electricity, would require the transmission from the power station of at least 77.8 horse-power for every train in motion. During commission hours, at present, there are sixty-three trains in motion on the Third avenue line. This would require 4901.4 horse-power. The power now exerted moving the locomotives would do no more than cover the losses of transmission attending any other system.

During the day this engine made nine round trips, occupying 20 hours with waiting time, and in doing so used 42,959 pounds of water and 5,760 pounds of anthracite coal. There are exceptionally good means of keeping an accurate account of coal and water used on the Elevated Railroad locomotives, and there is no doubt but these figures are more nearly correct than the particulars usually got from surface railroad tests. The coal consumption was reckoned from the time the banked fire was spread in the engine-house till the locomotive returned in the evening with as nearly as possible the same depth of fire made by the banking. No allowance is made for cleaning fires or for loss of heat while waiting for trains. There were 7.4 pounds of water evaporated from a tank temperature of 62 degrees Fahr. for every pound of coal consumed (making no deduction for a small quantity entrained), which indicated a particularly high boiler efficiency. The conditions of operating, however, prevent the engine from using the steam to good advantage. In the nine round trips run, steam was used for an aggregate time of six hours. Dividing the pounds of coal used by this time and the average indicated horse-power, we get 5.8 pounds of coal consumed per horse-power per hour. This makes no allowance for the losses of heat due to the great amount of running done without steam being used, or to that due to waste by the safety valve during detentions at terminal points or for the steam used in operating the brakes, which must have been considerable. Had the engine been permitted to run all its trips in close succession, and had the deductions been made for the losses referred to the work of pulling the trains would probably have been done slightly under 5 pounds of coal per indicated horse-power.

With the terminal steam pressure so high as these small engines have to maintain it that the work required may be done, there is no opportunity to use steam economically, and no improvement can be effected unless heavier engines with larger cylinders are employed or a lighter load given them to pull, changes which in this case are inadmissible and are not advisable, since the achieving of any net economy would be by no means assured.

NATIONAL CAR BUILDER

PUBLISHED MONTHLY
BY
R. M. VAN ARSDALE.
MORSE BUILDING..............................NEW YORK.

JAMES GILLET,
ANGUS SINCLAIR, } *Editors.*

JULY, 1885.

Subscription.—$1.00 *a year for the United States and Canada; $1.50 a year to Foreign Countries embraced in Universal Postal Union*

CONTENTS.

Illustrations: Page
Standard Form of Treads and Flanges of Wheels 86
Proposed Standard Freight Car Truck 92
Operating Elevated Railroad Trains.—Indicator Diagrams 95
Improved Horizontal Boring and Drilling Machine 98

Communications:
Relative Economy of Good and Poor Wheels 91
A Large Pile-Driving Machine 91
Driving-Wheel Remover and Replacer 93

Editorials:
The Car-Builders' Convention 95
Master Mechanics' Convention................ 96
A Representative Air-Brake Trouble 96
Railroads Need Protection 97
Automatic Freight-Car Brakes.................. 97
West Shore Locomotives... 97

Miscellaneous:
Master Car-Builders' 19th Annual Convention........ 86
Standard Freight Car Truck, Report on.......................... 87
Automatic Freight Car Brakes, Report on 88
End Platforms for Freight Cars, Report on.... 89
Standard Dead-Blocks, Report on 89
Passenger Car Framing and Trussing, Report on...... 89
Railroad Appliances, Examination of 90
Revised Rules of Interchange 90
Boston & Albany Railroad Shops... 93
Steel and Iron Axles 93
Protection against Inferior Car Wheels.............................. 94
Crude Petroleum as Fuel.. 94
A Durable Fire-Box... 94
New Locomotives for the Old Colony Railroad.... 94
Enormous Passenger Traffic 94
Work of Operating Elevated Railroad Trains. 94
Widdifield and Button Automatic Brake........... 97
Dealing with Disabled Forney Locomotives......... 97
Novel Method of Using Steel Scrap.... 97
Shop Roofs 98

EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* The National Car-Builder. *Communications for the attention of the Editor should be addressed* Editor National Car-Builder.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock, construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notices of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* Car-Builder *is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of each month.*

THE CAR-BUILDERS' CONVENTION.

We give in our present issue the reports made by committees at the recent convention at Fortress Monroe, and also a comprehensive summary of the discussions, from which it will be seen that some perceptible progress was made towards the adoption of standards. The movement in this direction, although not as marked and decisive as might be desired, was nevertheless a forward one and not retrograde. The standard wheel tread and flange recommended by the committee, was ordered to letter-ballot, and also the choice as between the Christie and Collin brake shoes. A design for a standard freight-car truck was presented by the committee on that subject, in accordance with instructions, but it was deemed advisable before submitting it to letter-ballot for adoption, to have some trucks built and tested in regular service, so that any improvements that may be suggested can be reported to the next annual meeting. The design as presented seems to meet with general approval, and although there is to be another year of waiting, there is a fair prospect that the proposed standard will then be ready for adoption by the association.

A very interesting report was made upon automatic freight car brakes, but as the whole subject is yet in a comparatively crude state and in no condition for final action, the committee was continued. The question as to whether platform timbers or end sills are necessary to freight cars, was ably discussed in a lengthy, well-written, but rather one-sided report. No action was taken on the subject, however, and the committee was continued. In regard to standard dead-blocks, a 60,000-pound freight car, passenger car framing and trussing, appliances for the safety of trainmen, and one or two other subjects of minor importance, no progressive action was taken, some of the committees being continued and others discharged. A special session was devoted to the consideration of automatic couplers, but with no result except the adoption of resolutions deprecating legislative interference, and referring the whole subject to the executive committee.

The convention, in the matter of accomplished work, will not be a landmark in the history of the reorganized association. The number of members in attendance, including the new ones that were admitted, was about the same as that of last year at Saratoga. There was little outside diversion to interfere with the regular routine of business, and nothing occurred to cause a ripple or disturb the general harmony until the attention of the members began to be directed to the election of officers. As soon as it was ascertained that the committee on nominations had decided to present the name of Mr. R. H. Soule to succeed Mr. Garey as President of the Association, a vigorous canvass was begun in opposition to the action of the committee. There were, in fact, unmistakable signs of a contest, the first, we believe, that has occurred in the election of officers since the association was organized. It was not of a personal nature, however, but was precipitated by the clearly revealed purpose of that portion of the membership representing the Pennsylvania Railroad Company and its system of affiliated lines, to press the nomination of a representative of that system, or of some one more or less identified with its interests. This, in connection with a little sharp practice intended to exclude other candidates from being presented, roused a feeling of opposition which resulted in the election of Mr. B. K. Verbryck by the decisive vote of 50 to 25, but which was afterward made unanimous. The wisdom of the choice needs no indorsement from us. Mr. Verbryck's acknowledged ability and large experience as a car-builder, his long connection with the association, and the high esteem in which he is held personally, are a sufficient guarantee of efficiency in his new position as presiding officer. It is but right to say that he received the support of a number of representative members who at first favored the Pennsylvania movement, but who recognized the manifest propriety of choosing a master car-builder to preside over a master car-builders' association. Although this little surface ripple has subsided for the time being, at least, it has produced an agitation in the depths which can hardly fail to exert a salutary influence in the way of frustrating in future any open or covert attempts to make the association subservient to the interests of any particular road or system of roads. In making this matter a subject of comment instead of passing it over as if it had not occurred, we have no desire to throw into the association a firebrand of dissension. The firebrand was, in fact, already there, and the best way to prevent a conflagration is to sound the alarm and turn the hose on the brand.

When the association was reorganized in 1882, some apprehensions were felt that the new representative element might not readily assimilate with the old membership so as to insure harmonious co-operation. Until the recent annual meeting these apprehensions seemed apparently groundless. But this little Pennsylvania episode has revealed a state of things in the internal working of the reconstructed organization that is perhaps inherent in its nature. It contains two elements, but they are not necessarily antagonistic, nor can the representative element absorb or swallow the other without wiping out the Master Car-Builders' Association, as such. The old association determined how it should be reorganized, or, in other words, it reconstructed itself in order to increase its efficiency, and its efficiency to-day depends as much upon its preserving its identity and distinctive character intact as a master car-builders' association, as upon the introduction of its representative membership. The importance of this we have urged ever since the new departure was broached, and we now say that in order to prevent its identity from being frittered away, a master car-builder must hold the reins, preside over its deliberations and appoint the committees.

As a significant sequel to the efforts to secure the ascendency of the Pennsylvania system in running the association, Mr. Wall lost no time in giving notice of a proposed amendment to the constitution, the effect of which, if adopted, will be to compel the President to consult with the Executive Committee in appointing the regular committees, and special committees also, upon subjects for investigation and discussion, instead of exercising that power untrammeled as he now does. Had a Pennsylvania man been chosen President, it is probable that Mr. Wall's notice would have been given less promptly. In the matter of tinkering the constitution, we would suggest, from a layman's standpoint, of course, that the language in Art. III. Sec. 3, prescribing the qualifications of representative members, is not as clear and as explicit as it might be. It says: "Any person having a practical knowledge of car construction *may* become a representative member by receiving a written appointment, etc." The obvious intent of this wording is to leave the door open to persons who have *not* such practical knowledge, and at the same time not necessarily exclude those who have it. If this is the meaning, the words should be arranged so as to clearly express it. The word "may" implies a good deal of discretion in case its exercise should be deemed expedient.

We have no desire to underrate the excellence of the methods and appliances pertaining to the car equipment of the Pennsylvania system of roads. If all, or any of them, shall be found worthy of adoption as models and standards, upon fair investigation, uninfluenced by prejudice or favoritism, let them be recommended as such, and upon their merits, and not because they are approved by the officials and managers of that system. But if such appliances and methods are to be accepted arbitrarily as criterions of what is best, then they might as well be adopted at one swoop and have done with it, saving time, labor and an enormous amount of unnecessary friction.

MASTER MECHANICS' CONVENTION.

The recent Railway Master Mechanics' Convention happened to meet during one of the sweltering periods that Washington is noted for during the summer season, and it argued well for the interest taken in the proceedings that the members sat patiently through the long sessions in a stifling room of a badly-ventilated house instead of betaking themselves to the open air or to the numerous attractions of sight-seeing. The meeting was unusually well attended, and quite a valuable addition was made to the membership, the rising generation of young master mechanics being well represented among the latest accessions to the roll.

As the members began to arrive, the leading topic of conversation heard among them was the lamented death of their president, John H. Flynn. The popular esteem in which the late president was held could be fairly judged from the warm, spontaneous encomiums expressed as old friends grasped hands on meeting, and proceeded to dilate on the general loss. Some of his old associates and friends spoke eloquently in the meeting about the manly and professional worth of Mr. Flynn, but much more touching words were spoken the evening before, in a small room where an informal meeting was held to decide about the course to be followed in giving public token of respect.

The meeting was opened under encouraging auspices. In welcoming the Railway Master Mechanics to Washington, Commissioner Edmunds, of the District of Columbia, made a most appropriate and pleasant address. He spoke of the Association as being composed of master magicians who were engaged in revolutionizing the conditions of human existence, and whose contests had not been for dominion over man through fields of blood, but through God-like supremacy of mind over matter. Vice-President Barnett, notwithstanding that he was a little nervous at the beginning of the meeting, developed into an able chairman, possessing the tact and firmness requisite to control men and push business rapidly forward in an assembly where freedom of discussion was liable at times to breed confusion. Mr. Barnett's opening address was one of the ablest inaugural speeches ever delivered since the Association was formed. He feelingly referred to the melancholy event which required that he should preside at that meeting and mentioned the other losses that death had inflicted upon them. He reviewed the work the Association had done, commended Secretary Setchel for the valuable services he had rendered during the fifteen years he has held office, and spoke of the great improvements effected on the locomotive since the Association was formed, which brought this form of engine among the most economical types of prime movers. Yet the possibilities of improvement were far from exhausted, and he pointed out that by employing still higher steam pressure and better means of distributing the steam, much more economical results might be obtained. The address made an excellent impression and was warmly praised on all sides.

The papers submitted to the meeting in the form of reports were above the average in interest and mechanical importance. Some of them were exceedingly long, and more than an hour was occupied in reading single papers. We believe it would be beneficial for the Association, more interesting to the members, and conducive to the production of more facts during debates, if arrangements could be made to have the papers printed before the opening of the Convention and circulated among the members, so that the reading of long papers might be dispensed with. This system is advantageously followed in other technical associations, and there is no reason why it should not be particularly profitable here, for there are few meetings where so many interesting facts are brought out in debate as in the Master Mechanics' Conventions; and any change that would leave greater time for debate could not fail to prove beneficial.

Some of the most interesting discussions heard in the Master Mechanic's Conventions are those brought out during the noon hour by the introduction of short questions. Two of the best debates at the last meeting originated in this way, one of them being on depth of flanges, the other on traction increasers. The debate on wheel flanges drew attention to an important subject where a standard could easily be established, and ought to be settled without delay; for there is no sense in the prevailing practice of having tire flanges rolled ¼-inch too deep, which has to be turned down before the wheel is put in service. The same discussion drew attention to another matter that has been too long neglected, viz., the diverse sizes of driving-wheel centers. The adoption of a few standard sizes for driving-wheel centers would prove of great convenience to tire-makers, and would prevent the existing necessity that many roads experience of carrying a heavy stock of tires because their sizes have to be rolled after the tires are ordered. A curious debate arose on a section of the report on Improvements in Boiler Construction. If there is any one subject that American master mechanics are practically unanimous about, it is the safety and economy of using mild steel for fire boxes. But for some reason a railroad paper of St. Louis has been for some time persistantly abusing steel, and questioning the wisdom of using it in boilers or fire-boxes. Owing to this, an expression of opinion was called for about the comparative value of iron and steel for fire-boxes, and the members responded very freely. After many speeches, some of them vigorously defending the use of steel, a resolution was unanimously passed indorsing steel for inside fire-boxes. The report on boiler construction, which elicited this discussion, is the end of a long series of reports on the subject that contain probably the most valuable information about boilers ever collected.

The reports on The Improvement in Locomotive Valve Gear and on New Plans for Construction and Improvement of the Locomotive, indicate that a few master mechanics and mechanical engineers are working industriously on the problem of taking more work out of the coal consumed in locomotive fire-boxes. That some of these efforts will eventually be successful, cannot be doubted.

During the progress of the meeting there were several persistent attempts at axe-grinding made, but no alarming success was achieved in that sort of industry. There is too much practical common sense among the men composing the Master Mechanics' Association for the body to be carried away by the advocates of mechanical quackeries.

Owing to our restricted space, we are not able this month to publish the procceedings of the Master Mechanics' Convention complete, so we think it best to keep the whole over for next issue, when a full report of papers and discussions will be given.

A REPRESENTATIVE AIR-BRAKE TROUBLE.

We have good reason to believe that many engineers running passenger trains in the neighborhood of New York are lamentably ignorant of the construction of the Westinghouse automatic air-brake. Men who would scorn the imputation of not knowing how to deal promptly with any failure about the locomotive's mechanism seem perfectly contented to operate the air-brake and know no more about its details than the routine movements of applying and releasing the brake. In the hands of such men, the simplest kind of derangement makes the brake inoperative. One day, recently, a train on the Erie Railway we were traveling with stopped at a station, and when the engineer tried to start he could not move the train. He whistled off brakes, supposing that some of the car-brakes had not released, and the train-men went down and examined the brake shoes on all the cars and found that none of them were holding the wheels. After some more time was spent by the engineer reversing and trying to start the train with a jerk, the fireman got down and examined the tender brake and found that it was fast on. A hole had been drilled in the side of the drain cup of the triple valve and plugged up. The trouble now was that the plug had come out, letting the air escape, so that pressure enough could not be got to force up the piston that controls the admission of air to the brake cylinder. To overcome the trouble, and release the brake, the brilliant engineer set to work and took down the brake rods. After this was done he still found the air was blowing through the plug hole, and means were then sought to stop that source of air waste. A slim wooden plug was driven into the hole, but it was blown out directly. The fireman then came to the rescue with an old file and hammered the shank into the hole. His hammer blows were delivered as vigorously as if the file end was going into a pine log, instead of into an expensive apparatus liable to be ruined by anvil treatment. His strong blows did not prove effective, however, for the file shank being square and the plug hole round, the leakage of air was only partly stopped. When fifteen minutes had been wasted doing worse than useless work, it seemed to occur to the runner that there might be a way of shutting off air from the triple valve, so he pushed the fireman aside and began twisting around the four-way cock, and after trying it in various positions, struck by accident on its closure point; the operation he ought to have done the moment he found the brake would not release itself.

Five or six years ago, when the automatic air-brake was not very familiar to Western engineers, we knew of a similar difficulty having happened to a train on an Iowa railroad. One of the car-brakes gave the trouble in that instance, but the engineer was severely censured for not knowing how to cut off the air promptly. There was some excuse for engineers not being familiar with the details of the automatic air-brake when it was new to them, but there is no excuse for men who have handled the brake for years failing to do the right thing promptly when a slight derangement happens. Men who will not voluntarily learn the important part of their business relating to meeting emergencies with the power begotten of knowledge, are not fit for the position of locomotive engineer on a passenger train, and the company that employs men so ignorant of obvious duties is not doing justice to itself or to the traveling public. We have recently read that a society of locomotive firemen have got the section of a triple valve and other apparatus relating to a locomotive's mechanism placed in their lodge room, and that they have lively discussions about the operating of the same. A good many locomotive engineers would learn many facts they are painfully in need of knowing, if they would follow the example of that lodge of firemen.

AUTOMATIC FREIGHT-CAR BRAKES.

Although nothing was done by the Master Car-Builders' Association regarding the report on automatic freight-car brakes that indicated they believed any decided action to be necessary at present, the discussion that followed the reading of the report showed that the subject is receiving close attention and is rapidly coming to the front for action of some kind. Five years ago, it was scarcely possible to find a master car-builder or other railroad officer who believed that automatic freight-car brakes were practicable or desirable. To-day it is hard to find a master car-builder who is not looking forward to putting on some form of continuous freight-car brake in the near future. All the testimony brought out was in favor of using automatic freight-car brakes. As their use becomes extended, it will seem as surprising to railroad men, that objections were raised to the introduction of such brakes for freight cars, as it now appears singular that ever railroad managers opposed automatic brakes for passenger train equipment.

Merchants are becoming aware of the fact, that the era of freight being moved at the rate of ten miles an hour has passed, except on slow lines, which are getting to be carefully avoided. The accelerating law of competition steps in here, and it may safely be left to quicken freight train speed. That is the spur which supplies the weekly item of news, that a certain road has decided to equip a freight train with an automatic brake. For perishable freight, twenty-five per cent. of decreased time in transit means a material saving of property, and where live stock is transported a long distance, a material decrease of time on the road means a material saving of shrinkage which a shipper ought to pay for by a higher freight charge, since he can well afford to do so.

There is less fast running needed to materially accelerate the speed of freight trains equipped with automatic brakes than is popularly supposed to be the case. The delay with an ordinary freight train in getting over a road arises mostly from the necessity for crawling slowly into stations through the engineer having no control of the train, and the necessity for reducing speed at numerous points where other trains or obstructions may be expected. A change that enables an engineer to maintain ordinary speed till he is within sight of a station, and then to pass on when he finds no call for stopping, prevents a serious reduction of running time, and may get the train over a division 25 per cent. faster without the actual speed being increased at all. Every time the speed of a freight train has to be reduced entails heavy working of the engine to force the train into speed again, an operation that represents heavy fuel consumption. The saving of fuel alone that would result from the general fuse of automatic freight brakes, would soon contribute an important part towards defraying the first cost of the equipment. This is an item of saving that is very little considered, for most people think that increasing the speed of freight trains on account of their being under control of a good brake, will increase the coal consumption, which is a decided mistake. When we consider all other sources of saving that the safe and fast movement of freight trains would provide, it is hard to determine how any railroad having a living business, can afford to drag its freight trains over the road at ten miles an hour.

RAILROADS NEED PROTECTION.

Some five or six years ago, a great many intelligent business men saw a threatening cloud looming up in the shape of railroad monopoly. They were apprehensive that the great trunk lines, under the control of their respective magnates, would enter into a mighty combination to control legislation, and then, by exacting exorbitant rates, make the great business interests of the country tributary to their rapacious greed. The only hope was that the spirit of competition might possibly defeat such a scheme. But if the worst should come there was still a silver lining to the cloud in the shape of large expenditures by the prosperous roads for equipment and supplies, which would keep manufacturers busy, and benefit indirectly other branches of industry.

Such was the outlook from the point of view of these alarmists a few years ago, but the monopoly scare has turned out to be the biggest kind of bugbear. Competition has already done its perfect work. The shippers of freight over the great lines are in need of no protection against combination and extortion. It is the railroads themselves that now need protection against the ruinous rates resulting from senseless rivalries that have demoralized the whole business of railroad transportation. There is at present a large volume of traffic both of passengers and freight, which, at fair and reasonable rates would yield sufficient revenue to keep track and equipment in good and serviceable condition, and stimulate the supply market by making the needful purchases.

A general and permanent reaction in rates, as it seems to us, can only save railroad property from ruinous depreciation. How to bring about such reaction, in view of the obstacles which lie in the way, is a troublesome question. It is easy to say what ought to be done, but the practical question is, What can be done? Pooling arrangements that can be violated with impunity can not be depended upon for any length of time. It is absurd to suppose that a lot of competing lines, each one of which is a law unto itself, with financial disaster impending and the point of exhaustion almost reached, will all at once stifle their mutual jealousies and faithfully adhere to a compact for the maintenance of more remunerative rates. The element of competition must be eliminated to a very great extent, or there is no assurance of stability. If the advanced rates are not based on good faith, they will turn out to be only temporary, unsettling the markets and shaking public confidence more than ever in the ability of the roads to reconcile their hostile interests upon any basis that is not liable to be disrupted as soon as made.

In the existing relations of railroads in this country, it is manifest that they are powerless to protect themselves against the evils of competition o long as human nature remains as it is now. Protection must be looked for from the outside, and it is likely to be obtained, if obtained at all, in two ways, namely: a legal check to the construction of parallel lines that are competitive, speculative, and not required by the demands of traffic; and the application of some effective means for the enforcement of penalties for the breaking of compacts. What is the use in building new roads to suck the blood of the old ones, when the old ones have no surplus of blood to spare? And what is a compact between a lot of hungry business competitors good for, the observance of which is merely optional with the parties interested? In the latter case, the greater the profits accruing to each, the greater the mutual distrust and suspicion that some one is getting more than his share. The compact is first broken covertly, then openly, and then a rate war follows, which is all the more protracted and bitter because the means are at hand, in the shape of accumulated profits under the compact, for carrying it on.

WEST SHORE LOCOMOTIVES.

Two years ago the locomotive equipment designed for the New York, West Shore & Buffalo Railway was exciting much attention in mechanical railroad circles, owing to the radical departure that had been made from ordinary American practice. All the more advanced notions introduced in late years on the American locomotive were adopted, many features were added that were purely English, and not a few proportions different from ordinary practice were settled by the designers. They had untrammeled freedom in selecting parts and proportions that the experience of many years in different countries had proved conducive to economy in fuel and durability in service. As the expressed desire was to build locomotives that would make the greatest possible mileage without having to go into the repair shop, at the same time pulling trains with the least possible consumption of coal, all railroad men interested in economical train operating watched the experiment with attention. There was an impression among many American master mechanics, that from some unexplained cause, the British locomotive was much more economical in the use of fuel than the ordinary Americam engine. As Mr. Howard Fry, under whose supervision the New York, West Shore & Buffalo locomotives were designed, was an Englishman by birth and training, it was expected that he would combine in his locomotives all the features that made English engines light on fuel, along with the constructive excellence that makes the American locomotive so durable in service.

The high expectations raised respecting the success of these engines were never realized. Little has been said publicly regarding the engines, but it is well known that they have never operated economically, displayed durability, or done the work so efficiently as ought to be expected from the size of the locomotives. That the present mechanical management of the road have become dissatisfied with the first types of locomotives is shown conclusively by a style of engine recently designed. There are twenty engines of the new design being built in the Rogers Locomotive Works, Paterson, N. J., and they look very much like the style of locomotive most popular in this country five years ago, only a little heavier. They have deep fire-boxes passing down between the frames, short smoke-boxes and diamond stacks. The four-bar guide is used with a very heavy cast-iron cross-head, and nearly all other parts are those of the ordinary American locomotive. About 300 pounds extra weight has been added to each cylinder, and there is some 600 pounds dead weight put in the deck casting. The engines have cylinders 17 × 24 inches, wheels 5 feet diameter, and about 1,200 feet of heating surface. They are intended for local passenger train service, and look as if they would do the work well.

As a sequel to the announcement in our last issue of Mr. M. N. Forney's resignation of the office of Secretary of the Car-Builders' Association, we take pleasure in saying that he has consented to retain the office for an indefinite time, and that he was accordingly re-elected to the position at a meeting of the Executive Committee held after the adjournment of the convention at Fortress Monroe. It is to be hoped, in the interest of the Association, that this appointment will prove to be a permanent one.

The Widdifield and Button Automatic Brake.

In the brief description of this brake which we gave in our May number in connection with the trial tests made on the Lehigh Valley road, it was said that one of the friction pulleys was of brass. This was an error, and in order to correct it we copy the following from the inventor's descriptive circular:

> "We derive our power from the axle of the car by means of friction gear. On the axle we use a pulley composed of paper and soft metal. This pulley is cast and finished on the axle without removing the axle from the car. We use a paper pulley because it is cheaper in first cost and much more durable than iron, and because it is perfectly satisfactory and gives a uniform power which a metal pulley will not do. On our brake spindle is mounted an iron pulley, which is brought into working contact with the axle pulley by a lever which is controlled by a light cable or rod, which extends to both ends of the car, and is so arranged that it is operated by the forward drawbar; consequently the brakes are always set and released from the forward end of the car."

Wheel Remover and Replacer.

While attending the Master Mechanics' Convention, several of the members, in the course of conversation, claimed that they had seen devices used for years similar in many respects to the Driving Wheel Remover and Replacer, illustrated in the NATIONAL CAR BUILDER of June and patented by Mr. J. H. Vreeland, Master Mechanic of the New York, Lake Erie & Western Railroad, Jersey City. On this subject Mr. W. H. Thomas, Master Mechanic of the Chesapeake & Ohio Railroad, Huntington, W. Va., writes us:

> "I send you by mail a blue print of the drop pit about which I spoke to you when in Washington, at the Master Mechanics' Association. You will notice I had this put into use prior to Nov. 5, 1878 (the drawings not being made for sometime afterward), at Renova, Pa., on the P. & E. RR. I understand that one of the same kind was put in at Altoona, and one at Sunbury, Pa. There is also one in operation on this line at Hinton, W. Va. I used a screw for the reason I had no hydraulic jack at hand, and times being hard, the requisition for one was cut off, notwithstanding it was my intention to use it in the beginning. I have since learned that the pit at Renova is operated by a hydraulic jack, two laborers operating it at a very trifling cost. You will notice it is nearly a fac-simile of the one shown in your last issue."

Dealing with Disabled Forney Locomotives.

The Brooklyn Elevated Railroad Company have adopted Forney locomotives, similar in all respects to those used on the elevated railroads of New York. The company before hiring engineers subjected them to an examination as to what they would do in case of certain accidents happening to the machinery of the engines. These engines have the eccentrics placed on the forward axle, a fact which made a question asked in the examination very puzzling to the engineers who have been accustomed to locomotives with the eccentrics on the same axle as the main rod connects to. The question was: "What would you do in case a side rod broke, or crank pin broke?" With an ordinary locomotive the answer would be, "Take off both side rods and go on," but with the eccentrics on an axle separate from that operated by the main rods, the motion would not work right after the side rods were gone. Breakage of a side rod entirely disables an engine of this kind, and the proper action on the part of an engineer is to take down both side rods and wait to be pulled in.

The engineers on these elevated roads are generally very dexterous in getting a locomotive ready to move after a break-down. Whatever happens, they seem always ready to act promptly to prevent any delay not absolutely unavoidable. One day recently an engine knocked out a cylinder head through a cross-head pin breaking, and the engine was started with one side after a delay of fourteen minutes. This was remarkably quick work, considering that it had to be done on the exposed structure, where it was difficult to obtain a footing.

Novel Method of Using up Steel Scrap.

Mr. A. J. Stevens, General Master Mechanic of the Central Pacific Railroad, contributes to the *American Machinist* the following particulars about the method he follows at his shops at Sacramento, Cal., for utilizing steel scrap.

> "I do not remember having seen any account of scrap steel having been worked up in any other way than by melting. During the past nine years we have worked up under the hammer a large quantity of scrap steel; we pile the steel on a board, the same as we would scrap iron, and take a welding heat in a reverberatory furnace. We place upon the anvil block of the steam hammer a casting having an opening through it 12″x10″. This casting is about 12″ thick. In the hammer-head, we have a die which fits the opening in the lower casting; when the steel is sufficiently heated we dump it into the recess in the lower casting and strike it a blow with the hammer; then another lot of

heated steel is added and driven in as before; this is repeated until the opening is filled. When this is accomplished we strike it three or four smart blows, then raise the casting up and drive the ingot out. By this process the particles of steel are thoroughly welded, the ingots can then be put under the hammer and drawn out into any desired shape. We make all our locomotive guide bars, all our track tools—such as hammers, lining bars, tamping bars, spike bars, and a great many other tools from this scrap steel. We have made good drills and can make most any other tools from cast steel scrap worked up in this way. The cost of working up the scrap steel in this manner is about twenty dollars ($20) per ton."

Shop Roofs.

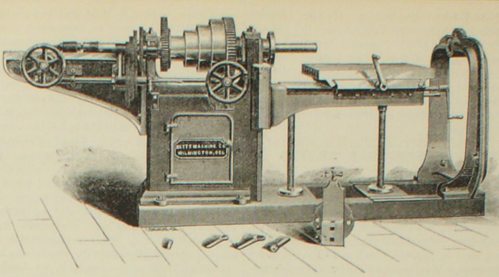
In England and on the continent, a style of roof is in common use for shops and factories, which deserves to be known in this country. The roof itself is divided into sections, all of which pitch in the same direction, usually toward the south. In an end view the appearance is like a ratchet. Windows are placed in the vertical portions which face to the north. A few roofs of this kind have been built in this country. There is a large one in Paterson, N. J., which was built a short time ago. The advantages of this form of construction are very many, and engineers abroad have given much attention to the best method of framing, details of construction, etc. Each individual portion of the roof is small, without breaks and has a good pitch. The distances between the lines of posts are found to be sufficient for the spans. These being small, the roof trusses are light. The roof lights, instead of being placed in a special structure built on the surface of the roof, set, like ordinary windows, in the vertical divisions between the sections of the roof. A better illumination is obtained in this way than from the ordinary roof windows, because the windows are nearer together and there is a greater area of glass. A northern exposure is preferred, as this excludes, to a great extent, the direct rays of the sun. Below the windows and at the bottom edge of the roof, a gutter carries off the drainage. The ventilation, as well as the lighting, may be made very perfect. The advantages in construction are very great, and the only drawback that has yet been suggested is, that snow might perhaps have to be removed. In this respect the roof is not worse than most of the flat roofs in common use, which have to be shoveled off after every storm.

Inventions and Appliances Exhibited at the Car-Builders' and Master Mechanics' Conventions.

Mann Boudoir Car Co., New York.—Sleeping car, with Lincrusta-Walton decoration.
Ensign Manufacturing Co., Huntington, W. Va.—Six freight cars, equipped with Titus & Bossinger's automatic coupler.
Lehigh Valley R. R. Co.—Four freight cars equipped with Mr. H. Stanley Goodwin's new truck, the Widdifield & Button friction brake, and Curtis & Wood couplers.
Eames Automatic Vacuum Brake.—A new design, shown by model.
New York Rubber Co.—Corrugated brake hose.
Widdifield & Button.—Friction brake, car and model.
Colburn Automatic Friction Brake.
Conway Bell Cord Brake.
Colburn's Wood and Paper Brake Shoe.
Collin Brake Shoe.
Christie Brake Shoe.
"Common Sense" Brake Beam.
Standard Brake Shoe.
Marden's Steel Brake Beam.
Thurber Steel Wheel, for Passenger Coaches, Locomotives and Tender Trucks.
Ellis Wrought Iron Wheel.
Dickson Mfg Co.—Spring Plate Steel Tired Wheel.
Allen Paper Car Wheel Co.—Paper Wheel.
Diagonal-Rod Standard Truck, Proposed by Lehigh Valley R. R.
Oriental Metal Mf'g Co., Oriental Journal Bearings.
Geo. R. Meneely & Co., Self-Fitting Journal Bearings.
Baker Automatic-Lock Self-Adjusting Journal Box.
Brigham Self-Oiling Skeleton Bearings.
Ajax Metal Co.—Ajax Metal.
Granular Metal Co.—Granular Metal, samples and old brasses.
Vulcanized Fiber Co.—Vulcanized Fiber.
Noyes & Woodbury's Cooling Compounds.
Elastic Packing Co.—Packing for Journal Boxes.
Smith & Owen.—Heater and Hot Water Circulator.
Pelug Platin Paint.
United States Metallic Packing Co.—Packing for Locomotives.
Baker Old and "Perfected" Heaters.
Peter Smith's Heater.
Fennerty's Upper Deck Ventilator.
Coolbaugh's Tail-Light and Engine Lamp Holders.
Van Dusen Nut Lock.
I. A. Williams & Co.—Head-Light Illuminated Numbers.
Conway Derailed Truck Safety Sling.
National Tube Works.—Macks Injectors.
Roberts Woven Wire Car Seat.
Wakefield Rattan Co.—Cane and Rattan Car Seats.
Hale & Kilburn Manufacturing Co.—Car Seats.
Lincrusta-Walton for Decoration of Cars.
Robinson's Balance Slide Valve.
Beaudry's Upright Power Hammer.
Lewis Bolt and Rivet Cutter.
Chase's Lifting and Weighing Jack.
Butler's Draw-Bar Attachment.
Wagner Car Door.
Johnson Car Door Fastener.
Chicago and Shepard Car Roofs.
Murtfeldt's Car Roofing.
Asbestos Packing Co.—Asbestos Packing.
Preservative Architectural Wood Finish.
Bowler & Co.—Frogs and Crossings.
Ramapo Iron Works.—Safety Switches, Switch Stands, etc.
Car Couplers.—Cowell's, Hartwell's, United States, Van Dorstan's, Colby's, Curtis & Wood's, Ames', Stanford's, Wilson-Walker's, Wood's, Dowling's, Follett's, McKeen's, Archer's, Barnes', Howe's, Meadows', Bond's, Nutting's, Perry's, Meredith's, Taylor's, Janney's, Thurmond's, Joo's, Hein's, Titus & Bossinger's, Conway-Ball's, Hooper's, Fish's, Thomas', Sherman's, Peter Campbell's, D. McD. Campbell's, Eccleston's, Watkin's, Craig's, White's, Park's, Harrison's, Mitchell's, and Dr. Chappel's.

The following newly projected railroads are announced:

Massena Springs & Fort Covington (6 miles), Massena Springs, N. Y., James Wright, contractor; the Wilcox R. R., of Philadelphia, Pa. (5 miles), J. Bayard Henry, President, Philadelphia; a road from Chattanooga, Tenn., to Walder's Ridge (13 miles), J. W. Adams, President.



IMPROVED HORIZONTAL BORING AND DRILLING MACHINE.

We herewith illustrate the improved horizontal boring and drilling machine recently built by the Betts Machine Company, Wilmington, Delaware. It is intended to combine all the features necessary for rapid and accurate work. The steel spindle can be driven in either direction by means of open and cross-belts on the countershaft; it has a full bearing throughout the cast-iron spindle at all times, and does not lose any of its bearing surface as it is run out; it has quick movement by hand through a rack and pinion; there are three changes of feed, which are automatic and positive through cut gears, and controlled by means of a clutch attachment conveniently situated. It has compound tables arranged to move vertically, with horizontal movements at right angles with, and parallel to, the boring spindle. The table is elevated by two screws and bevel gears. The cast-iron spindle is provided with a face-plate, to which can be screwed a facing tool, thus adapting the machine to the large range of work of this character. A steady rest for the outer end of the boring bars is also furnished, which gives rigidity to the machine. The cut represents the No. 1, or small machine. The larger size, intended for much heavier work, is of quite similar design, except in it the tables are raised and lowered by power, through worm gearing. The manifold advantages of this class of machines for boring and drilling upon an adjustable table are evident. Work can be drilled by it that could not be done in an ordinary drill-press, and it has all the advantages of a facing lathe for many operations.

Mr. David T. Davis, Superintendent of the shops of the Galveston, Harrisburg & San Antonio Railway, died at his home in Houston, Texas, May 10, aged 51. He was born in Yarmouth, Maine, was master mechanic of the Vermont & Massachusetts road for several years, and afterward held a similar position on the Lake Shore & Michigan Southern. In 1878 he went to Texas and took charge of the Harrisburg shops of the above named road, where he remained until the time of his death. He was a thorough, practical machinist and had large experience in car construction. He was also highly esteemed for his personal qualities, and his loss is deeply felt by the company and the men who served under his superintendence.

Mr. James A. Knight, who was for many years Master Car-Builder of the Central Railroad of Georgia, at Macon, shot and killed himself, at Milner, Ga., June 16. He has been an occasional correspondent of the Car-Builder since the issue of its second number, nearly 15 years ago. Some two years since, he retired from the position he had so long held, but becoming tired of inaction, he again sought employment. It is said, however, that his tragic end was caused by disappointment in not being able to collect a considerable sum of money he had saved up and had intrusted to the care of a friend. He was 63 years old.

Light Locomotives.—This is the title of a book published by H. K. Porter & Co., Pittsburgh, Pa., for the purpose of giving information regarding the style of locomotives which that firm makes a specialty of building. Wood cuts are given showing a profuse variety of light locomotives, their use extending to every department of industry where freight has to be moved by land carriage. Locomotives built by this company are proved to be doing good service operating suburban passenger traffic on standard railroads, and from the size so employed they graduate down to the tiny engine with cylinders 5 × 10 inches, which pulls round the ladles of moulten steel in the rolling mills, or performs more efficiently the work usually done by mules in the lumber regions. A great variety of design is represented in the Porter locomotives. There are eight-wheel engines of the American type, moguls, Forney's and six-wheel engines of every conceivable description, the policy of the builders being to modify the design to suit the work which the engine was intended for. One small four-wheel engine is represented working a steam crane to lift cinder cars and dump them down the bank, after having pulled them to the place. Some of the mining locomotives shown display the exercise of ingenious mechanical ability in adapting them to do difficult work efficiently. Apart from describing light locomotives, the book gives valuable information about various matters connected with railroad construction and operating.

The National Paint Works, of Williamsport, Pa., are doing an active business in asphaltum paints, having recently shipped a car load of freight-car paint to the Chicago & Northwestern road; a car load to the Pullman Co., at Pullman, Ill., for painting cars of the Pennsylvania Company; 10 barrels to a large bridge company in Chicago; 24 barrels to Altoona for the Pennsylvania R. R.; 10 barrels to the Lake Shore road, and 8 barrels to the Phœnix Bridge Co., Phila. The company also have numerous smaller orders in hand from railroad companies and bridge and iron works.

The Cincinnati Corrugating Co., which entered its exhibits for competition at the New Orleans Industrial and Cotton Centennial Exposition, has been awarded the Gold Medal of the First Class for "Corrugated Iron for Building Purposes."

The firm of L. G. Tillotson & Co., manufacturers, importers and dealers in railway and telegraph supplies, Nos. 5 and 7 Dey street, New York, has been dissolved, the entire interest of the late Mr. L. G. Tillotson having been purchased by the surviving partner, Mr. E. S. Greeley, who will continue the business under the new firm name of E. S. Greeley & Co.

The Cummer Engine Co., Cleveland, O., have recently received orders for 170, 70, 100 and 130 h.-p. engines from the following parties respectively: Harney Peak Mining Co. of New York; Volney Q. Irwin, Crawfordsville, Ind.: Temple Pump Co., Chicago; and Forest City Carbon Co., Cleveland, O. They have also just shipped a 170 h. p. engine to the Lowell Manufacturing Co., Lowell, Mass., and a 105 h. p. engine to W. Kantsky, Indianapolis.

The officers elected at the recent convention of the Master Car-Builders' Association are as follows: President, B. K. Verbryck, Chicago; 1st Vice-President, Wm. McWood, Montreal; 2d Vice-President, John W. Cloud, Altoona, Pa.; 3d Vice-President, Edw. W. Grieves, Baltimore, Md.; Treasurer, John Kirby, Cleveland, O. The members of the Executive Committee are: John S. Lentz, Packerton, Pa.; R. C. Blackall, Albany, N. Y.; F. M. Wilder, Susquehanna, Pa.

It is gratifying to observe that our English cousins are looking toward America for devices to increase the safety of railway operating. It is not so very long since Yankee contrivances were regarded with decided suspicion all over Europe. In a recent communication to the London *Times*, a correspondent, urging the necessity for adopting automatic car-couplers, says that in America automatic car-couplers are almost universally used. We sincerely wish his statement was true.

Our Directory.

We note the following changes since our last issue. Our readers will do us a great favor by giving us prompt notice of any changes that may come to their knowledge or of any errors that may be noticed in our list:

Baltimore & Ohio.—James McCreighton has been appointed Superintendent of the Baltimore & Philadelphia Division; and H. P. Harris Superintendent of the Pittsburgh Division.

Brunswick & Western.—A. A. Gaddis has been appointed Vice-President and General Manager.

Chicago, Burlington & Quincy.—J. D. Besler, heretofore Superintendent of the Illinois Division, has been appointed General Superintendent of all the lines east of the Missouri River, in place of H. B. Stone, promoted to be General Manager. C. F. Resseguie succeeds Mr. Besler as Superintendent of Illinois Division.

Cincinnati, New Orleans & Texas Pacific.—John C. Gault has been appointed General Manager, in place of John Scott, resigned.

Cleveland, Lorain & Wheeling.—Charles H. Warburton has been appointed Master Mechanic.

East & West of Alabama.—T. J. Nicholl has been appointed General Manager, vice John Postell, resigned.

Fitchburg.—The title of J. W. Marden has been changed from Master Car-Builder to Superintendent of Car Department.

Hannibal & St. Joseph.—G. M. Shryock has been appointed Master Car-Builder, in place of Charles Coller, resigned.

Humeston & Shenandoah.—E. C. Murphy has been appointed General Manager, vice F. O. Wyatt.

Kansas & Gulf Short Line.—Eli Culverhouse has resigned as General Manager.

Louisville, New Albany & Chicago.—The car department has been separated from the mechanical department, and Charles Coller, late of the Hannibal & St. Jo., has been appointed Master Car-Builder.

Mexican National.—I. A. Eacutt has been appointed Superintendent of Third Division, vice Wm. Davis, resigned.

New York, Chicago & St. Louis.—A. H. Evans has resigned as Superintendent of the Western Division, and C. D. Gorham, recently of the New York, West Shore & Buffalo, has been appointed in his place.

Ohio & Mississippi.—J. H. Setchel has resigned as General Master Mechanic, and has accepted the office of Superintendent of the Brooks Locomotive Works.

Pennsylvania.—Edward D. Nelson has been appointed Superintendent of Motive Power of the Philadelphia & Erie Division, in place of A. D. Dayton, promoted.

Potomac, Fredericsburg & Piedmont.—The office of Superintendent, heretofore filled by W. M. Grafton, has been abolished, and W. H. Richards has been appointed General Manager.

Union Pacific.—John S. Hickey has been appointed Master Mechanic of Idaho Division in place of F. Reardon, who has been assigned to other duties.

Wabash, St. Louis & Pacific.—Jacob Johann having resigned as Superintendent of Motive Power and Machinery, J. B. Barnes has been appointed as his successor. O. J. Wilson succeeds Mr. Barnes as Master Mechanic of the Eastern Division.

Wisconsin, Iowa & Nebraska.—J. V. Johnston, in addition to his duties as local Treasurer, has been made Purchasing Agent.

How natural it is to try to get *something* for *nothing*, and expect satisfaction in the use of materials that look well but have no real merit. This is exemplified in painting cars as much as anywhere. The Perfect Method Paints manufactured by us insure durability and saving of time otherwise lost in repainting, or loss by decay of the wood and rust of the iron when the paint has perished, as most of the ordinary paint soon does.

THE SHERWIN-WILLIAMS CO.,
CLEVELAND & CHICAGO.

Manuf'rs High Grade Paints and Colors for Railway use.

Established 1856.

Shipman & Bolen, Mfrs. of fine Railway Varnishes.

Our Varnishes excel in durability,

Newark, New Jersey.

BOUND VOLUMES OF The National Car-Builder

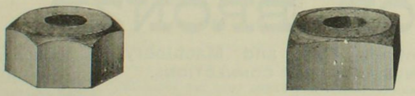
For 1880, 1881 and 1882.

Price, - - $3.00 each.

Rhode Island Tool Company,

MANUFACTURERS OF

COLD PUNCHED, SQUARE AND HEXAGON



MACHINERY NUTS

Specially Adapted for the Use of Locomotive and Engine Builders and Machinists Generally.

Samples Furnished on Application.

Small Forgings of all Kinds Made to Order.

PROVIDENCE, R. I.

JAMES T. PATTEN, RAILWAY EQUIPMENT.

REPRESENTING THE

Wason Mfg. Co., of Springfield, Mass. | Portland Company, of Portland, Me.
RAILWAY CARS, ETC. | LOCOMOTIVES.

18 BROADWAY (Welles Building), NEW YORK.

THE MANN BOUDOIR CAR.

PRIVACY, LUXURY, COMFORT. PERFECT VENTILATION.

Run regularly on express trains between

NEW YORK AND BOSTON (via Springfield).
N. Y., N. H. & H. and BOSTON & ALBANY Railroads.
Leave New York 10:30 P. M. | Leave Boston 10:30 P. M.
CHICAGO and DETROIT (Niagara Falls Short Line).
WABASH and the BALTIMORE & OHIO RAILROADS.
Leave Chicago 8:45 P. M. | Leave Detroit 9:40 P. M.
CHICAGO & ST. LOUIS, over the WABASH, ST. LOUIS & PACIFIC RAILWAY.
Leave Chicago daily 9:05 P. M. | Leave St. Louis daily 8:00 P. M.
CINCINNATI and LOUISVILLE, over the OHIO & MISSISSIPPI RAILWAY.
Leave Cincinnati 9:10 P. M. | Leave Louisville 1:45 A. M.
BALTIMORE and CINCINNATI, B. & O. R. R., "Limited" Express.
Leave Baltimore 1:30 P. M. | Leave Cincinnati 7:00 P. M.
NEW ORLEANS and CINCINNATI, QUEEN and CRESCENT ROUTE.
Leave New Orleans daily 10:00 A. M. and 10:00 P. M. | Leave Cincinnati daily, 8:30 A. M. and 8:47 P. M.
NEW ORLEANS & ATLANTA.
Leave New Orleans 9:00 P. M. daily. | Leave Atlanta 1:30 P. M. daily.
CINCINNATI and JACKSONVILLE, Fla.
Leave Cincinnati 8:47 P. M. and 8:30 A. M. daily. | Leave Jacksonville 8:50 P. M. and 7:40 A. M daily.
CINCINNATI and VICKSBURG.
Leave Cincinnati 8:30 A. M. and 8:47 P. M. daily. | Leave Vicksburg 8:00 P. M daily.

DINING CAR SERVICE. NEW YORK and BOSTON (via SPRINGFIELD). Mann's Boudoir Car Company runs elegant Dining Cars on the trains between New York and Boston, leaving each city at 11:00 A. M. and 4:30 P. M. Mann's Boudoir Car Co. is now prepared to negotiate with railroad companies for placing its cars in regular service on their roads.

PRIVATE CARS.—The cars "Adelina Patti" and "Janauschek," undoubtedly the most magnificent private cars in the world, are TO LET for long or short trips. They are provided with attendants, silver, table and bed linen complete. For further particulars and explanatory books apply to

MANN'S BOUDOIR CAR CO.,
WELLES BUILDING 18 BROADWAY NEW YORK.

CLEVELAND MALLEABLE IRON CO.,

MANUFACTURERS OF

REFINED MALLEABLE IRON CASTINGS

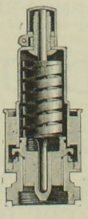
TO ORDER.

GENERAL RAILROAD AND CAR WORK A SPECIALTY.

Awarded Bronze Medal at National Exhibition of Railway Appliances, Chicago, 1883, for best Piece Malleable Iron Casting.

CLEVELAND, OHIO.

RICHARDSON'S PATENT INCASED



LOCOMOTIVE POP "SAFETY" VALVE,

WITH PATENT ADJUSTABLE SCREW RING.

The cut represents our new pattern Incased Locomotive "Pop" Safety Valve. The spring is *nickel plated* to protect it from corrosion. The construction of the case is such as to *greatly reduce* the noise of escaping steam. The capacity of the Richardson Valve to relieve a boiler is greater than that of *any other make*. They can be furnished with relief levers when required.

By a decision of Supreme Court, Washington, D. C., Jan. 19, 1885, our Patents were declared Valid, and we were awarded Profits and Damages against Crosby Steam Gauge and Valve Co. and a Perpetual Injunction.

We make Special Prices to Railroads and Locomotive Builders.

☞ *SEND FOR CATALOGUE.* ☜

The Consolidated Safety Valve Co.,

SOLE OWNERS AND PROPRIETORS.

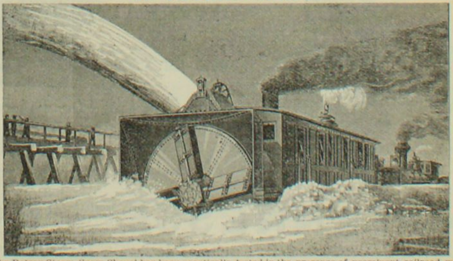
Salesroom:
111 LIBERTY ST., N. Y.

Factory:
BOSTON, MASS.

Rotary Steam Snow Shovel Manufacturing Co.,

OF PATERSON, N. J.

EVERY MACHINE

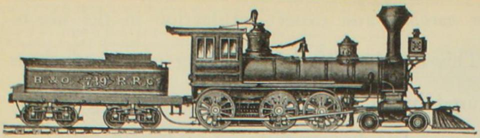


GUARANTEED.

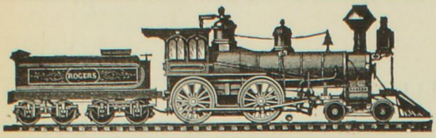
The Rotary Steam Snow Shovel has been practically tested in the presence of prominent railroad men and is acknowledged to be the only effective device ever invented.

NEW YORK OFFICE: 203 East Sixteenth Street.

J. S. LESLIE, President. H. J. WHITTEN, Secretary.
THOMAS PRICE, Western Agent, Lincoln, Neb.

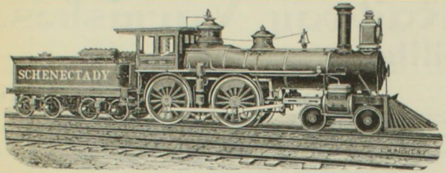


PITTSBURGH LOCOMOTIVE AND CAR WORKS,
PITTSBURGH, PA.
MANUFACTURERS OF
Locomotive Engines for Broad or Narrow Gauge Roads,
From standard designs, or according to specifications, to suit purchasers.
Tanks, Locomotive or Stationarv Boilers Furnished at Short Notice
D. A. Stewart, Prest. D. A. Wightman, Supt. Wilson Miller, Sec. & Treas.

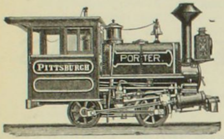


ROGERS LOCOMOTIVE AND MACHINE WORKS,
PATERSON, N J.
New York Office, 44 Exchange Place.
Manufacturers of Locomotive Engines and Tenders and other Railroad Machinery
J. S. ROGERS, President.
R. S. HUGHES, Secretary. } PATERSON, N. J.
WM. S. HUDSON, Sup't.
R. S. HUGHES, Treas.,
44 Exchange Place, New York.

RHODE ISLAND LOCOMOTIVE WORKS,
PROVIDENCE, RHODE ISLAND.
EARL PHILIP MASON, Vice-President. CHARLES FELIX MASON, President. ARTHUR LIVINGSTON MASON, Secretary.
WILLIAM P. CHAPIN, Treasurer. JOSEPH LYTHGOE, Superintendent. WILLIAM H. FENNER, Jr., Agent.

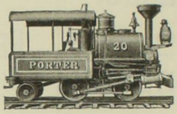


SCHENECTADY LOCOMOTIVE WORKS.
CHAS. G. ELLIS, President. EDWARD ELLIS, Treasurer.
WALTER McQUEEN, Vice-President. A. J. PITKIN, Superintendent.
SCHENECTADY, N. Y.



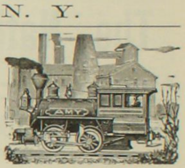
FOUR-WHEEL-CONNECTED TANK LOCOMOTIVE.

H. K. PORTER & CO.,
PITTSBURGH PA.



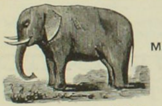
LOGGING LOCOMOTIVE

Builders of all Kinds of
LIGHT
Locomotives.
Send for Catalogue.



SHIFTING LOCOMOTIVE

TRADE MARKS:



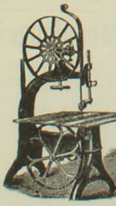
"Phosphor-Bronze."

PHOSPHOR-BRONZE,
For Bearings of Locomotives, Cars and Machinery,
SLIDE VALVES, CYLINDER RINGS AND STEAM CONNECTIONS.
SAVES OIL AND REPAIRS, PREVENTS DELAY TO TRAINS, AND NEVER CUTS THE JOURNALS.
Pamphlets and particulars on application to
THE PHOSPHOR-BRONZE SMELTING CO., Limited,
Office, 512 Arch Street, Philadelphia, Pa.
Owners of the United States Phosphor-Bronze Patents. Sole Manufacturers of Phosphor-Bronze in the United States.

Phosphor
Bronze.

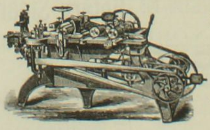
DAMASCUS BRONZE,
Formerly Manufactured by the WESTINGHOUSE MACHINE CO., now made exclusively by the Damascus Bronze Company for BEARINGS for Locomotives, Cars and Machinery.
We would call the attention of Master Mechanics and Master Car-Builders to our
PEERLESS BEARING METAL,
Claiming it to have more Anti-Friction qualities and to be more durable than any Bronze or Brass in the market.
The Metal is for Sale Either in Ingot or Castings.
DAMASCUS BRONZE COMPANY, PITTSBURGH, PA.

BAND SAW.



MANUFACTURERS OF WOOD-WORKING MACHINERY.

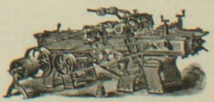
OUTSIDE MOLDER.



The Latest Improved
MACHINERY
for
Railroad Car Shops.

Planers, Vertical
Car Tenoners,
Gaining,
Tenoning,
Rotary Mortising Machines.

INSIDE MOLDER.

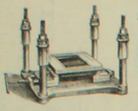


C. B. ROGERS & Co.,
MANUFACTORY, NORWICH, CONN.
WAREROOMS, 109 Liberty St., New York.

EWALD IRON COMPANY,
OWNERS AND OPERATORS OF
—TENNESSEE ROLLING WORKS.—
Tennessee Charcoal Bloom Boiler Plate, Flange, Fire Box, Sheet, Bar and Stay-Bolt Iron.
ST. LOUIS OFFICE, - - - - - 801 NORTH SECOND STREET.
MANUFACTURE CHARCOAL IRON EXCLUSIVELY.

PATENT PORTABLE

VALVE CHUCK.



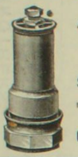
Combination Tool to be used with our Valve Seat Rotary Planin Machine for planing valves of locomotives.

SEND FOR CIRCULAR.

L. B. FLANDERS MACHINE WORKS,
PEDRICK & AYER, Proprietors,
PHILADELPHIA, PA.

CROSBY POP SAFETY VALVE,

FOR LOCOMOTIVES.



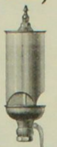
Also for Stationary, Marine, Por.able and Farm-Engine Boilers.

CROSBY IMPROVED STEAM GAGE.

For Locomotives and all other uses.

SINGLE BELL CHIME WHISTLE.

It has an agreeable tone. It is in use on many railroads, much to the satisfaction of the traveling public.



CATALOGUES ON APPLICATION.

CROSBY STEAM GAGE & VALVE COMPANY,
95 and 97 Oliver St., Boston.

THE ASHTON NOISELESS BLOW-BACK VALVE,

Silent Relief to Locomotives.
Waste Steam used to heat Feed Water.
Restrains the use of Shovel.
Large Economy of Fuel.

Our Open-Pop Valve has an unrivaled reputation.

THE ASHTON VALVE CO., 271 Franklin St., Boston, Mass.

SECOND-CLASS STREET RAILWAY CARS FOR SALE.

FOR SALE—Twenty second-class 16 foot Street Railway Cars, 5 feet 2 inches gauge.

For particulars call on or address

PEOPLE'S PASSENGER RAILWAY COMPANY,
PHILADELPHIA, PENN.

NATIONAL CAR-BUILDER "SUPPLEMENT."

We are now preparing the **FIFTH ANNUAL "SUPPLEMENT,"** and it will contain as follows:

Complete lists of every Car and Locomotive Builder, Axle, Car Wheel, and Car Spring Manufacturer in the United States and Canada.

All the Rail Mills of the country.

Complete lists of the Street Railroads in the United States and Canada, their Gauge, Weight of Rail, Mileage, number of Cars and Horses, O e Names and Addresses.

The Railroads (both Steam and Street) in Mexico, Central and South America and the West Indies, with the Gauge, Weight of Rail, Mileage, Number of Cars and Locomotives, Officers' Names and Addresses, etc.

This is the only publication that has ever given this information.

It will be distributed *gratuitously* to every person whose name appears in the paper, and in addition will be sent to every General Manager, Superintendent, Purchasing Agent, Chief Engineer, Master Mechanic, Master Car-Builder and Road Master of all Railroads in the United States and Canada.

The Supplement is the ONLY ADVERTISING MEDIUM which reaches all the Street Railroad Officers, and is the BEST and CHEAPEST means of reaching Railroad Officers in adjacent foreign countries.

It is the experience of the publishers, during the past five years, that Railroad men and others keep the "Supplement" on their desks or hung near at hand throughout the year for reference, not only for the lists, but for the advertisements, which form a conveniently indexed collection of trade circulars of nearly TWO HUNDRED of the best and most responsible manufacturers of railroad material, a collection not to be obtained in any other way.

As to its value as an Advertising Medium, we respectfully refer to a few of the prominent manufacturers who have used its pages, as follows

Adams & Westlake Manufacturing Co., R. R. Supplies, Chicago, Ill.
Ajax Metal Co., Journal Bearings, Philadelphia, Pa.
Andrews & Clooney, Car Wheels, etc., New York, N. Y.
Baldwin Locomotive Works, Philadelphia, Pa.
Baltimore Car Wheel Co., Car Wheels, Baltimore, Md.
Bass Foundry and Machine Works, Fort Wayne, Ind.
Beadle & Courtney, Fare Registers, etc., New York and Philadelphia, Pa.
Beamis Car Box Co., Springfield, Mass.
Brill, J. G. & Co., Cars, Philadelphia, Pa.
Brownell & Wright Car Co., Street Cars, St. Louis, Mo.
Congdon Brake Shoe Co., Chicago, Ill.
Dayton Manufacturing Co., Car Trimmings, etc., Dayton, O.
Day, Augustus, Snow Scrapers and Plows, Detroit, Mich.
Devoe, F. W. & Co., Paints & Varnishes, New York, N. Y.
Fay, J. A. & Co., Wood Working Machinery, Cincinnati, O.
French, A., Spring Co., Car Springs, Pittsburgh, Pa.
Goodell & Walters, Wood Working Machinery, Philadelphia, Pa.
Hathaway, Charles, Street Railway Contractor, Cleveland, O.
Hazard Manufacturing Co., Wilkes-Barre, Pa.
Higley Car Journal Co., Cleveland, O.
Hopkins, D. A., Journal Bearings, New York, N. Y.
Howard, James L. & Co., R. R. Supplies, Hartford, Conn.
Iron Clad Paint Co., Metallic Paints, Cleveland, O.
Lake & McDevitt, Grooming Machines, etc., Chicago, Ill.
Lewis & Fowler, Fare Registers, Brooklyn, N. Y.
Maher & Brayton, Car Wheels, Cleveland, O.
Midvale Steel Co., Axles, etc., Philadelphia, Pa.
National Car Spring Co., Car Springs, New York, N. Y.
Northwestern Horse Nail Co., Horse Nails, Chicago, Ill.
Penfield Block Co., Tackle Blocks, Lockport, N. Y.
Pennsylvania Steel Co., Philadelphia, Pa.
Pittsburgh Locomotive and Car Works, Pittsburgh, Pa.
Porter, H. K. & Co., Locomotives, Pittsburgh, Pa.
Rogers, C. B. & Co., Wood Working Machinery, Norwich, Conn.
Rogers Locomotive Works, Paterson, N. J.
Stephenson, John, Co., Street Cars, New York, N. Y.
Union Brass Manufacturing Co., Car Trimmings, etc., Chicago, Ill.
Valentine & Co., Varnishes, New York, N. Y.
Westinghouse Air Brake Co., Pittsburgh, Pa.
Whitney & Sons, Car Wheels, Philadelphia, Pa.

☞ A sample copy of the above paper will be sent on application.

ADVERTISEMENTS ARE SOLICITED AT THE FOLLOWING RATES:

One full page, 14 inches deep and 9½ inches wide, $125; Three-quarters of page, $100; Half page, $75; Quarter page, $50; smaller spaces, $10 for first inch, and $5 for each additional inch (single column).

For further particulars address **NATIONAL CAR-BUILDER "SUPPLEMENT,"**
140 Nassau Street, New York, N. Y.

W. D. WOOD & CO.'S
Limited.

PATENT PLANISHED SHEET IRON.

Patented March 14, 1865; April 8, 1873; Sept. 9 1873; Oct. 6, 1874; Jan. 11, 1876.

Guaranteed fully equal, in all respects, to the

IMPORTED RUSSIA IRON,

And at a much less price.

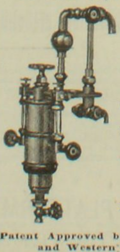
LOCOMOTIVE JACKET IRON

Our Specialty.

For sale by all the principal Metal Dealers in the large cities throughout the United States, and at their office,

111 Water Street, Pittsburgh, Pa.

The Seibert Cylinder Oil-Cup Co.,
53 Oliver St., Boston, Mass.,



Manufacturers of

DOUBLE SIGHT-FEED Locomotive **LUBRICATORS,**

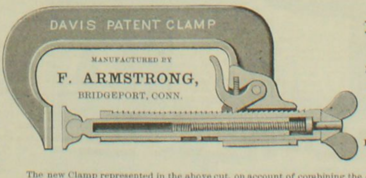
Under the Gates, Seibert and other patents,

For Oiling Cylinders Continually, whether Up or Down Grade.

Also, Oiling Air-Brake Pump from One Cup.

Patent Approved by both the Eastern and Western Associations.

THE EGAN COMPANY,
(Successors to the Cordesman & Egan Company),
MANUFACTURERS OF THE
Most Improved and Patented WOOD-WORKING MACHINERY,
Nos. 235 to 255 WEST FRONT STREET, CINCINNATI, O., U. S. A.



PRICE LIST

	Dozen.
No. 1, opens 3 in.....	$7.50
" 2, " 5 ".....	8.50
" 3, " 7 ".....	12.00

Sold by Leading Hardware Dealers.

The new Clamp represented in the above cut, on account of combining the qualities of quick adjustment and durability, recommends itself as the most practical tool of the kind ever offered in the market. It has the especial advantage over all others in clamping the work without displacement, being so constructed that in operating the plunger or screw it does not turn as in all other clamps, but is forced directly on the work by the thumb-screw.

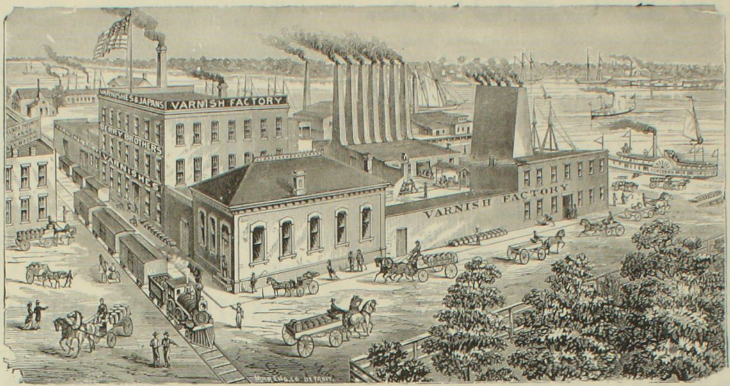
These clamps are made of the best malleable iron, and a trial of them will prove the justice of my claim for their being not only the cheapest and easiest working, but the only practical adjustable clamp made.

BERRY BROTHERS, DETROIT, MICH., MANUFACTURERS OF RAILWAY VARNISHES.

ESTABLISHED IN 1858.

USE BERRY BROTHERS'

RAILWAY VARNISHES.



Frontage on Wight Street, 218 ft.

Frontage on Liel Street, 900 ft.

ESTABLISHED IN 1858.

USE BERRY BROTHERS'

RAILWAY VARNISHES.

B. R. MILLER, General Agent.

ESTABLISHED 1770.

C. T. RAYNOLDS & CO.,

NEW YORK:
106 FULTON STREET.

CHICAGO, ILL.:
21 LAKE STREET.

MANUFACTURERS AND IMPORTERS OF

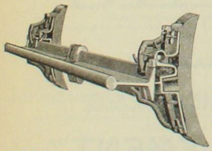
FINE RAILWAY AND COACH VARNISHES,
COACH JAPANS,
LIQUID DRYERS, etc., etc.

SPECIALLY PREPARED PAINTS FOR RAILROAD USE.
COACH COLORS IN JAPAN
PURE COLORS DRY AND GROUND IN OIL.
FINE BRUSHES FOR CAR WORK.

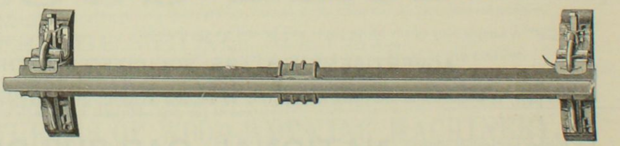
DAVID B. CROCKETT'S "PRESERVATIVE" AND "SPAR COMPOSITION."

C. D'W. GIBSON, PRES'T. A. H. MARDEN, TREAS. GEO. P. JOHNSTON, SEC'Y.

THE MARDEN CAR BRAKE COMPANY.

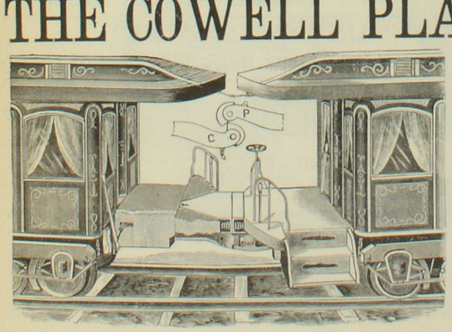


Indestructible Steel Beam.
Malleable Iron Head
To Fit any Shoe.
Security.
Durability.
Economy.



ROOM 3, SEARS BUILDING, - - - - BOSTON, MASS.

THE COWELL PLATFORM & COUPLING.



The Only Device Forming a CONTINUOUS FLOOR Between Moving Cars, and Making a Solid (Elastic) Train.

The tension of the Buffer Springs is applied *after* coupling the cars; it keeps the buffers *always* together, preventing all jerking in starting and bumping in stopping trains.

The Coupler (like the buffer) works perfectly with the Miller, costs no more, and uncouples easily by the use of one lever only.

The Cowell Freight Coupler is a combined Hook and Link Coupler—automatic in both cases.

It may be seen on the Fitchburg R. R., N. Y. Central, Providence & Worcester, Mich. Central, Valley Ry., N. Y., N. H. & Hartford, etc.

The Passenger device is used on Flint & Pere Marquette, Western & Atlantic, Cincinnati, New Orleans & Texas Pacific, Newburgh, Dutchess & Conn., N. Y. Central, Mann Boudoir Cars and others having trial trains.

Address

THE COWELL PLATFORM AND COUPLING CO.,
CLEVELAND, O.

DIRECTORY

of the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments

---

A

Adirondack R. R. 4-8½ gauge 60 m. 3 lo. 62 cars.
C. E. Durkee, *Supt*............Saratoga, N. Y.
Jacob Myers, *M. M*............Saratoga, N. Y.
Jas. J. Traver, *M. C. B*............Saratoga, N. Y.
Addison & Northern Penn'a Ry. 3 g. 51 m. 5 lo. 50 c.
F. M. Baker, *Gen. Supt*............Addison, N. Y.
Alabama Great So'n R. R. (*See Cin., N. O. & T. P.*)
Albany & Susquehanna R. R. (*See D. & H. Canal Co.*)
Albemarle & Raleigh R. R. 4-8½ g. 33 m. 3 lo. 35 c.
Jas. H. Petty, *Gen. Supt*............Tarboro, N. C.
Albert Ry. 4-8½ g. 51 m. 3 lo. 35 cars.
G. A. Robinson, *Man. & Pur. Agt*.Hillsboro, N. B.
Jas. McKay, *M. M. & C. B*............Hillsboro, N. B.
Alexandria & Fredericksburg Ry. } *See Penna. R. R.;*
Alexandria & Washington R. R. } (7) *Div.*
Allegheny Valley R. R. 4-9 g. 259 m. 70 lo. 2202 c.
David McCargo, *Gen. Supt. & Pur. Agt.*; and
C. B. Price, *Supt.* (Riv. Div.)............Pittsburg, Pa.
A. A. Jackson, *Supt.*(L. G. Div.).Reynoldsville, Pa.
W. A. Wood, *M. M*............Verona, Pa.
R. Gunning, *M. C. B*............Verona, Pa.
Alliance, Niles & Ashtabula R. R. (*See Penna. Co.*)
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, *Supt. & Pur. Agt*..Annapolis, Md.
John L. Beall, *M. Mach*............Annapolis, Md.
Anniston & Atlantic R. R. 3 g. 9 m.
Tho. K. Scott, *Supt*............Anniston, Ala.
Antwerp & Paulding R. R. 4-8½ g. 6 m. 4 lo. 63 c.
E. C. Munson, *Gen. Man*............Antwerp, O.
William Fitzsimmons, Jr., *Pur. Agt*.Antwerp, O.
Arizona & New Mexico Ry. 3 g. 71 m. 3 l. 60 cars.
W. H. Jones, *Gen. Supt. & P. A*.Lordsburg, N. M.
W. C. Boylan, *M. M. & M C. B*.Lordsburg, N. M.
Arkansas Midland R. R. 3-6 g. 63 m. 4 lo. 45 cars.
A. H. Johnson, *Pr. & Gen. Man*...Helena, Ark.
J. B. Johnson, *M. M. & M. C. B*...Helena, Ark.
Arkansas & Louisiana Ry. 4-8½ g. 28 m.
J. D. Beardsley, *Supt*............Washington, Ark.
Asheville & Spartanburg R. R. 5 g. 49 m. 2 lo. 12 c.
Jas. Anderson, *Supt. & Pur. Agt*..Spart'b'g, S. C.
M. M............Spartanburg, S. C
Ashland Coal & Iron Ry. 4-8½ g. 22 m. 7 lo. 432 c.
Douglas Putnam, Jr., *Gen. Supt*. Ashland, Ky.
Robt. Peebles, *Pur. Agt*............Ashland, Ky.
E. M. Roberts, *M. M*............Ashland, Ky.
Ashtabula & Pittsburgh Ry. (*See Penna. Co.*)
Atchison, Topeka & Santa Fé R. R.
4-8½ g. 2,620 m. 348 lo. 9,629 cars.
A. A. Robinson, *Gen. Man*............Topeka, Kan.
Geo. B. Harris, *Asst. Gen. Man*...Topeka, Kan.
Geo. Hackney, *Supt. Mach*............Topeka, Kan.
Clem. Hackney, *Asst. Sup. Mach. Dept*. do.
A. C. Armstrong, *Pur. Agt*............Topeka, Kan.
Eastern Div.: D. J. Chase, *Supt*....Topeka, Kan.
Henry Hull, *G. F. Car Dept*....Topeka, Kan.
John Fagan, *M. M*............Atchison, Kan.
J. M. Smith, *M. M*............Kansas City, Mo.
Alfred Taylor, *M. M*............Emporia, Kan.
Mid. Div.: H. R. Nickerson, *Supt*. Nickerson, Kan.
W. Y. Johnson, *M. M*............Nickerson, Kan.
W. Div.: C. M. Rathburn, *Supt*.....La Junta, Col.
A. C. Stiles, *M. M*............La Junta, Col.
D. H. Dotterer, *M. M*............Raton, N. M.
Las Vegas Div.: Chas. Dyer, *Supt*. Las Vegas, N. M.
F. B. Woodruff, *M. M*......Las Vegas, N. M.
J. H. Holman, *M. M*............Wallace, N. M.
Rio Gr. Div.: P. F. Barr, *Supt*. San Marcial, N. M.
E. Hackett, *M. M*............San Marcial, N. M.
H. P. Olcott, *M. M*............Deming, N. M.
Geo. A. Hancock, *M. M*......El Paso, Tex.
Sonora Div.: 265 m.
L. H. Waugh, *M. M*............Guaymas, Mex.
Kan. Cy., Law. & So. Kan.
4-8½ g. 399 m. 24 lo. 787 c.
J. L. Barnes, *Supt*............Lawrence, Kan.
T. D. Volk, *M. M*............Ottawa, Kan.
Atlanta & West Point R. R. (*See Western of Ala.*)
Atlantic & Danville Ry. 3 g. 17 m.
E. G. Sweatt, *Gen. Man*............Waverly, Va.
Atlantic & North Carolina R. R. (*See Midland; N. C.*)
Atlantic, Tenn. & Ohio R. R. (*See Rich. & Dan.; (2) Div.*)
Atlantic & Pacific R. R. 4-8½ g. 575 m.
F. W. Smith, *G. Supt*............Albuquerque, N. M.
F. P. Wherry, *Pur. Agt*............St. Louis, Mo.
Geo. Chalender, *Supt. M. P. & M.*, and
Geo. F. Chalender, *A. Supt*. Albuquerque, N. M.
B. C. Bosworth, *M. M*............Coolidge, N. M.
Augusta & Knoxville R. R. (*See Port Royal & Aug.*)
Austin & Northwestern R. R. 3 g. 60 m. 5 lo. 75 c.
J. A. Rhomberg, *Gen. Man*............Austin, Tex.

B

Bachman Valley R. R. (*See Han. Junc., Han. & Gett.*)
Balt. & Delaware Bay R. R. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, *Gen. M. & P. A*. Chestertown, Md.
Baltimore & Hanover R. R. (*See H. J., H. & G.*)
Baltimore & Ohio R. R.
4-8½ g. 1,612 m. 574 lo. 17,339 cars.
B. Dunham, *Gen. Man*............Baltimore, Md.
N. S. Hill, *Pur. Agt*............Baltimore, Md.
Main Stem Div.: 4-8½ g. 972 m.
W. M. Clements, *Gen. Supt*...Baltimore, Md.
A. J. Cromwell, *M. of M*............Baltimore, Md.
E. W. Grieves, *M. C. B*............Baltimore, Md.
Andrew Beckett, *M. M*............Baltimore, Md.
Wm. Edwards, *M. M*...Martinsburg, W. Va.
Sam. Houston, *M. M*.......Piedmont, W. Va.
Robert Maxwell, *M. M*.......Cumberland Md.
W. P. Harris, *Supt. West of*.Cumberland, Md.
S. B. Crawford, *M. M*............Grafton, W. Va.
Alex. Laird, *M. M*.......Parkersburg W. Va.
W. B. McClung, *M. M*.....Wheeling, W. Va.
Pitts. Div.: H. P. Harris, *Supt*....Pittsburgh, Pa
I. N. Kalbaugh, *M. of M*......Pittsburgh, Pa.
Trans-Ohio Divs.: G. J. Foreacre, *G. Supt*. Newark, O.
W. H. Harrison, *M. of Mach*............Newark, O.
E. L. Weisgerber, *M. M*............Newark, O.
H. M. Ingler, *M. M*............Bellaire, O.
O. B. Perkins, *M. M*............Zanesville, O.
Thos. Taylor, *M. M*............Sandusky, O.
F. J. Gunther, *M. M*.....Chicago Junction, O.
Chi. Div.: F. H. Britton, *Supt. Trans*. Chicago, Ill.
Benj. Lowther, *M. M*............Garrett, Ind.
W. H. Wilkinson, *M. M*............Kingston, Ill.
C. H. Campbell, *M. M*............So. Chicago, Ill.
Newark & Straitsville Div.: N. Criswell, Shawnee, O.
Baltimore & Philadelphia. 4-8½ g. 40 m. 7 lo. 35 c.
B. Dunham, *Gen. Man*............Baltimore, Md.
Jas. McCreighton, *Supt*......Wilmington, Del.
Baltimore & Potomac R. R. (*See Penna. R. R.; (7) Div.*)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, *Supt. & Pur. Agt*..Bangor, Me.
C. S. Nason, *M. M*............Bangor, Me.
J. W. Comins, *M. C. B*............Oldtown, Me.
Bangor & Portland Ry. 4-8½ g. 25 m. 3 lo. 3 c.
C. Miller, *Pres. & Gen. Man*...Blairstown, N. J.
Barclay R. R. 4-8½ g. 16 m. 6 l. 200 c.
F. F. Lyon, *Supt*............Barclay, Pa.
J. A. Hardenburg, *Pur. Agt*..21 Cort. st., N. Y.
Wm. Johnson, *M. M*............Towanda, Pa.
Batesville & Brinkley R. R. 3 g. 40 m. 3 lo. 42 c.
R. W. Martin, *Pres*............Little Rock, Ark.
W. J. Thompson, *Gen. Man*..Little Rock, Ark.
E. Summerfield, *Gen. Supt*......Brinkley, Ark.
John White, *M. M*............Brinkley, Ark.
Bath & Hammondsport R. R. 3 g. 10 m.
Allen Wood, *Gen. Man*..Hammondsport, N. Y.
Baton Rouge, Grosse Tête & Opelousas R. R.
5-6 g. 29 m. 3 lo. 12 c.
D. C. Montan, *Gen. Supt*......Port Allen, La.
Bedford & Bloomfield Ry. 3 g. 43 m. 5 lo. 86 cars.
Jas. W. Kennedy, *Gen. Supt. & Pur. Agt.*; and
Capt. John Thumser, *M. M*.......Bedford, Ind.
Jas. Richards, *M. C. B*............Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 112 m 5 lo. 71 c
S. L. Mooney, *Pres*............Woodsfield, O.
W. R. Crumpton, *Gen. Man*......Zanesville, O.
C. E. Hill, *M. M*............Zanesville, O.
Bell's Gap R. R. 4-9 g. 25 m. 5 lo. 148 cars.
R. G. Ford, *Supt. & Pur. Agt*....Bellwood, Pa.
Geo. Van Brunt, *M. M*............Bellwood, Pa.
A. Zimmerman, *M. C. B*............Bellwood, Pa.
Belt R. R. 4-8½ g. 12 m. 10 lo.
W. P. Ijams, *Supt*............Indianapolis, I
Belt Ry. 4-8½ g. 27 m
Jas. D. Carson, *Gen. Man*............Chicago, Ill.
R. W. Johnson, *M. M*............Chicago, Ill.
Bennington & Glastonbury. 4-8 g. 10 m.
R. C. Root, *Pres*............Bennington, Vt.
Bennington & Rutland Ry. 4-8½ g. 59 m. 10 lo. 236 c.
E. D. Bennett, *Supt. & Pur. Agt*. Bennington, Vt.
Chas. McMasters, *M. M*............Rutland, Vt.
Berlin Branch R. R. (*See Han Junc., Han. & Gett.*)
Bladen, Columbus & Florida. 4-8½ g. 16 m. 2 lo. 2 c.
John Colville, *Pres*............Wilmington, N. C.
Bodie & Benton Ry. & Com. Co. 3 g. 34 miles.
Thomas Holt, *Supt. & Pur. Agt*..... Bodie, Cal
E. H. Barton, *M. M. & C. B*............Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 37 m. 8 lo. 108 c.
Supt. & P. A..Worcester, Mass.
Frank I. Goodwin, *M. M*.... Worcester, Mass.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 87 m. 18 lo. 1,038 cars.
H. L. Morrill, *Gen. Man*..Mechanicsville, N. Y.
C. H. Cory, *Pur. Agt*... Mechanicsville, N. Y.
C. H. Cory, *Supt. & M. M*. Mechanicsville, N. Y.
John S. Ellis, *M. C. B*.....Mechanicsville, N. Y.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 7 lo. 46 c.
C. A. Hammond, *Supt. & P. Agt*. Boston, Mass.
R. D. Sutherland, *M. M*............Boston, Mass.
John Coghlan, *M. C. B*............Boston, Mass.
Boston, Winthrop & Point Shirley R. R.
3 g. 10 m. 1 lo. 8 c.
C. A. Parks, *Supt*............Boston, Mass.
J. W. Davis, *M. M*............Winthrop, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, *Gen. Man*............Boston, Mass.
Edw. Gallup, *Gen. Supt*......Springfield, Mass.
A. B. Underhill, *Supt. M. P*...Springfield, Mass.
F. D. Adams, *Gen. M. C. B*.......Allston, Mass.
J. T. Chamberlain, *For. C. Shop*. Allston, Mass.
H. B. Chesley, *Div. Supt*............Boston, Mass.
G. H. Colby, *Div. M. M*............Boston, Mass.
C. E. Grover, *Div. Supt*....Springfield, Mass.
H. W. Eddy, *Div. M. M*....Springfield, Mass.
J. B. Weston, *For. Car Sh*. Springfield, Mass.
W. H. Russell, Jr., *Div. Supt*. E. Albany, N. Y.
T. B. Purvis, *Div. M. M*...East Albany, N. Y.
J. E. Doran, *For. Car Sh*..East Albany, N. Y.
Boston & Lowell R. R.
4-8½ g. 555 m. 147 lo. 3,262 cars.
C. S. Mellen, *Gen. Supt*............Boston, Mass.
F. H. Nourse, *Pur. Agt*............Boston, Mass.
Jas. K. Taylor, *Supt. R. S. & M*. Concord, N. H.
So. Div.: J. F. Crockett, *Supt*......Boston, Mass.
H. S. Kolseth, *M. M*............Boston, Mass.
No. Div.: Geo. A. Todd, Supt ....Concord, N. H.
Geo. E. Shepard, *Pur. Agt*...Concord, N. H.
C. C. Aspinwall, *M. M*............Concord, N. H.
Wh. Mt. Div.: W. A. Stowell, *Supt*. Woodsville, N. H.
Geo. A. Ferguson, *M. M*...Lake Village, N. H.
Boston & Maine R. R. 4-8½ g. 491 m. 209 lo. 4,660 c.
J. T. Furber, *Gen. Man*............Boston, Mass.
Geo. J. Fisher, *Pur. Agt*............Boston, Mass.
Wm. Smith, *Supt. M. P*............Boston, Mass.
D. C. Richardson, *M. C. B*.....Lawrence, Mass.
West. Div.: Wm. Merritt, Jr., *Supt*. Boston, Mass
East. Div: D. W. Sanborn, *Supt*..Boston, Mass.
North Div.:
J. W. Sanborn, *Supt*..Wolfboro Junc., N. H.
Boston & N. Y. Air Line R. R. (*See N. Y., N. H. & H.*)
Boston & Providence R. R. 4-8½ g. 67 m. 52 lo. 1,006 c.
A. A. Folsom, *Gen. Supt. & P. A*. Boston, Mass
Geo. Richards, *M. M*............Roxbury, Mass.
Jno. Lightner, *M. C. B*............Roxbury, Mass.
Bowling Green & Toledo R. R. 4-8½ g. 6 m. 2 lo. 4 c.
Wm. A. Wiggins, *Gen. Man*. Bowling Green, O.
Wm. A. Wiggins, *Pur. Agt*..Bowling Green, O.
Bradford, Bordell & Kinzua R. R. 3 g. 42 m. 6 lo. 82 c.
Bradford, Eldred & Cuba. 3 g. 54 m. 6 l. 158 c.
Tonawanda Valley & Cuba. 3 g. 60 m. 5 lo. 31 c.
J. V. D. Loomis, *Supt*............Attica, N. Y.
Jno. Delaney, *M. M. & C. B*......Bradford, Pa.
Brattleboro' & Whitehall R. R. 3 g. 36 m. 3 lo. 56 c.
(*Operated by Central Vermont.*)
Bridgton & Saco River R. R. 2 g. 16 m. 2 lo. 19 c.
Wm. F. Perry, *Gen. Supt*......... Bridgton, Me.
M. M. Caswell, *M. M. & Pur. Agt*. Bridgton, Me.
Brighthope Ry. 3 g. 37 m. 4 lo. 193 cars.
Jas. R. Worth, *Supt*............Richmond, Va.
P. M. Buckingham, *Pur. Agt* Richmond, Va.
A. Gary, *Supt. Way & Works*. Winterpock, Va.
Robt. Kredell, *M. M*............Chester, Va.
Brooklyn, Bath & Coney Island R. R.
4-8½ g. 7 m. 8 lo. 36 cars.
Geo. A. Gunther, *Gen. Man*...Brooklyn, N. Y.
Aug. Wolff, *M. M*............Brooklyn, N. Y.
Brooklyn, Flatbush & Coney Island Ry.
4-8½ g. 8 m. 8 lo. 54 c.
J. L. Morrow, *Supt. & P. A*...Brooklyn, N. Y.
Wm. Finley, *M. M*............Brooklyn, N. Y.
Brooklyn & Rockaway Beach R. R.
4-8½ g. 3 m. 2 lo. 18 cars.
Wm. Warner, *Supt*......East New York, N. Y.
Brunswick & Western R. R. 5 g. 172 m. 13 lo. 170 c
A. A. Gaddis, *Gen. Man. & P. A*. Brunswick, Ga.
W. R. Kline, *M. M*............Brunswick, Ga.
Buff., N. Y. & Phil. R. R. 3 & 4-8½ g. 655 m. 120 l. 6,339 c.
Geo. S. Gatchell, *Gen. Supt*...... Buffalo, N. Y.
W. W. Halsey, *Asst. to G. Supt*..Buffalo, N. Y.
Allen Vail, *M. M*............Buffalo, N. Y.
Buff. Div.: Henry Dwyer, *Supt*.... Buffalo, N. Y.
Roch. Div.: J. R. Watson, *Supt*...... Olean, N. Y.
Pitts. Div.: E. H. Witter, *Supt*......Oil City, Pa.
H. J. Bookhammer, *M. M*..........Oil City, Pa.
C. E. Turner, *M. M*............Olean, N. Y.
Burlington, Cedar Rapids & Northern Ry
4-8½ g. 989 m. 96 lo. 4,206 cars.
C. J. Ives, *Pres. & Gen. Supt*. Cedar Rapids, Ia.
Robt. Williams, *V. P. & G. Supt*. Cedar Rapids Ia.
T. Stickney, *Pur. Agt*............Cedar Rapids, Ia.
R. W. Bushnell, *M. M. & C. B*. Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 35 m. 4 lo. 64 c.
G. L. Linsley, *Gen. Man. & Supt*. Burlington, Vt.
F. G. Brownell, *M. M*............Burlington, Vt.
Burlington & Mo. Riv. R. R. (in Neb.) (*See C. B. & Q.*)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 97 c.
Burlington & Western R. R. 3 g. 15 m. 38 c.
E. S. Edger, *Supt*............Burlington, Ia.
Burlington & Ohio River R. R. 4-8½ g.
R. Tanner, *Pur. Agt*............Chicago, Ill.

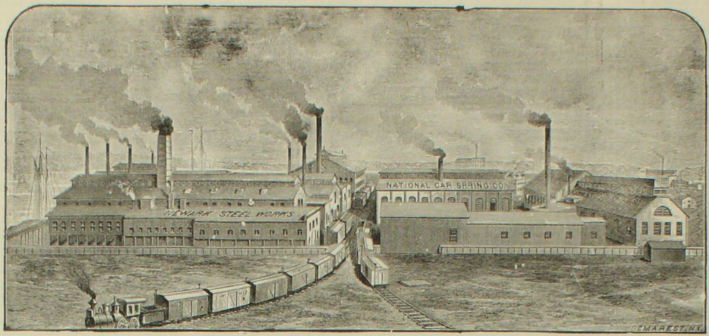
C

California Northern R. R. 4-8½ g. 26 m. 2 lo. 17 c.
Andrew J. Binney, *Gen. Man*..Marysville, Cal.
California Southern R. R. 4-8½ g. 127 m. 13 lo. 301 c.
J. N. Victor, *Supt*............National City, Cal.
J. M. Keith, *M. M*............National City, Cal.
Camden & Atlantic R. R. (*See Penna. R. R.; (2) Div.*)
Canada Southern Ry. (*See Mich. Cen.; (2) Div.*)
Canada Atlantic Ry. 4-8½ g. 135 m.
D. C. Linsley, *Man*............Ottawa, Ont.
M. Donaldson, *M. M*............Ottawa, Ont.
Canadian Pacific R. R. 4-8½ g. 1,742 m. 118 l. 2,726 c
W. C. Van Horne, *Gen. Man*....Montreal, Can.
Francis R. F. Brown, *Mech. Supt*. Montreal, Can.
W. H. Kelson, *Gen. Storekeeper*. Montreal, Can.
E. Div.: *Gen. Supt*. Montreal, Can.
W. Div.: J. M. Egan, *Gen. Supt*..Winnipeg, Man.
Ontario Div.: W. White, *Gen. Supt*. Montreal, Can.
Cape F'r & Yadkin Val. R. R. 4-8½ g. 112 m. 7 lo. 60 c.
W. M. S. Dunn, *Gen. Supt*...Fayetteville, N. C.
Isaac W. Clark, *M. M. & C. B*..Fayetteville, N. C.
Cape Girardeau Southwestern Ry.
4-8½ g. 52 m. 3 lo. 51 cars.
Louis Houck, *Gen. Man*..Cape Girardeau, Mo.
W. A. Penney, *Supt*......Cape Girardeau, Mo.
D. L. Meyers, *Pur. Agt*....Cape Girardeau, Mo.
Fred Glover, *M. M*.........Cape Girardeau, Mo.
Carolina Central R. R. (*See Ral. & Aug.*)
Carillon & Grenville Ry. 5-6 g. 13 m.
R. W. Shepard, *Pres*............Montreal, Can.
Carson & Colorado R. R. (*See Va. & Truckee*).
Catasauqua & Fogelsville. 4-8½ g. 25 m. 6 lo. 581 c.
C. W. Chapman, *Supt. & P. A*. Catasauqua, Pa.
J. Thomas, *M. M*............Hokendauqua, Pa.
Chas. J. Holbach, *M. C. B*.....Catasauqua, Pa.
Catskill Mountain R. R. 3 g. 16 m. 2 lo. 26 cars.
Charles A. Beach, *Supt*............Catskill, N. Y.
Cazenovia, Canastota & De Ruyter. (*See U., I. & E.*)
Central and South-Western Railroads (Ga.).
5 g. 1,115 m. 145 lo. 2,008 cars.
W. G. Raoul, *Pres*............Savannah, Ga.
Wm. Rogers, *Gen. Supt*............Savannah, Ga.
C. H. Carson, *Pur. Agt*............Savannah, Ga.
Cen. Div.: D. D. Arden, *M. M*......Savannah, Ga.
T. F. Warwick, *M. M*............Augusta, Ga.
F. Devine, *M. C. B*............Savannah, Ga.
So.-West'n Div.: T. D. Kline, *Supt*.....Macon, Ga.
D. M. Gugel, *M. M*............Macon, Ga.
S. A. Charpiot, *M. C. B*............Macon, Ga.
Central R. R. of N. J. (*See Phil. & Read.; N. J. Cen. Div.*)
Central American & Pacific Ry. 3 g. 67 m. 1 lo. 11 c
W. C. Fitzsimmons, *Gen. Supt*..Escuintla, Guat.
Central Branch Union Pac. (*See Mo. Pac.; (3) Div.*)
Central Iowa Ry. 4-8½ g. 412 m. 50 lo. 2,313 cars.
E. L. Dudley, *Supt*............Marshalltown, Ia.
J. G. Johnston, *Asst. Supt*....Marshalltown, Ia.
D. D. Phelps, *Asst. Supt*............Monmouth, Ill.
C. H. Ackert, *Pur. Agt*............Marshalltown, Ia.
John Player, *M. M. & M. C. B*. Marshalltown, Ia.
Central Ontario Ry. 4-8½ g. 33 m. 4 lo. 66 cars.
J. B. McMullen, *Gen. Man*............Picton, Ont.
James Falconar, *M. M*............Trenton, Ont.
Central Pac. R. R. 4-8½ g. 4,303 m. 382 lo. 11,260 c.
A. N. Towne, *Gen. Man*....San Francisco, Cal.
J. A. Fillmore, *Gen. Supt*...San Francisco, Cal.
R. H. Pratt, *A. G. Supt*....San Francisco, Cal.
J. R. Watson, *Gen. Pur. Agt*..Sacramento, Cal.
A. J. Stevens, *Gen. M. M*.....Sacramento, Cal.
W. McKenzie, *Asst. G. M. M*..Sacramento, Cal.
Benj. Welch, *Gen. M. C. B*....Sacramento, Cal.
G. J. Turner, *Asst. G. M. C. B*. Sacramento, Cal.
Western: Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, *Supt*............W. Oakland, Cal.
G. D. Welch, *M. M.* (W. Div.) W. Oakland, Cal.
W. B. Ludlow, *M. C. B.* (W. Div.) do.
S. Johnson, *M. M.* (T. Div.)........Tulare, Cal.
J. B. Wright, *Supt*............Sacramento, Cal.
M. W. Cooley, *M. M.* (*S. Div.*) . Rocklin, Cal.
Truckee Div.: J. H. Whited, *Supt*. Wadsworth, Nev.
Geo. Gregg, *M. M*............Wadsworth, Nev.
Wm. McPherson, *F. Car Sh*..Wadsworth, Nev.
Humb't Div.: G. W. Coddington, *Supt*. Carlin, Nev.
W. F. Smith, *M. M*............Carlin, Nev.
J. C. Doughty, *For. Car Sh*......Carlin, Nev.
Salt Lake Div.: A. G. Fell, *Supt*.....Ogden, Utah.
James Lamb, *M. M*............Terrace, Utah.
A. Sherburne, *For. Car Sh* .... Ogden, Utah.
St. & Cop. R. R.: R. L. Myrick, *Supt*..Stockton, Cal.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, *Asst. Supt*....Los Angeles, Cal.
James Velsir, *M. M*............Los Angeles, Cal.
T. T. Gilleland, *For. Car Sh*. Los Angeles, Cal.
Arizona Divs. (So. Pac.):
J. A. Muir, *Asst. Supt*............Tucson, Ariz.
W. F. Smith, *M. M*............Tucson, Ariz.
Rio Grande (S. Pac.) & El Paso (G. H. & S. A.) Divs.:
C. B. Seymour, *Supt*............El Paso, Texas.
J. L. Bonner, *M. M*............El Paso, Texas.
H. C. Standish, *For. Sh* ....El Paso, Texas.
Central Texas & N'w'n R. R. (*See Hous. & Tex. Cen.*)
Central Vermont R. R. 4-8½ g. 864 m. 185 lo. 2,789 c.
J. W. Hobart, *Gen. Man*............St. Albans, Vt.
J. M. Foss, *Gen. Supt*............St. Albans, Vt.
W. J. Robertson, *Supt. M. P*....St. Albans, Vt.
No. Div.: I. B. Futvoye, *Supt*.....St. Johns, P. Q.
Rut. Div.: J. Burdett, *Supt*............Rutland, Vt.
N. L. Davis, *M. M. & C. B*......... Rutland, Vt.
Brattleboro & Whitehall R. R., and
Brat. Div.: E. F. Brooks, *Supt*...Brattleboro, Vt.
New London No'n R. R. 143 m. 22 lo. 303 c.
C. F. Spaulding, *Supt. & P. A*. New London, Ct.
I. N. Dow, *M. M*............New London, Ct.
S. O. Banks, *M. C. B*............New London, Ct.
Chagrin Falls & Southern R. R. 3 g. 6 m. 1 lo. 12 c.
W. Hutchings, *Gen. Man*.....Chagrin Falls, O.
J. W. Williams, *Gen. Supt*....Chagrin Falls, O.
Charleston & Savannah Ry. 5 g. 115 m. 15 lo. 200 c.
H. S. Haines, *Gen. Man*............Savannah, Ga.
C. S. Gadsden, *Gen. Supt*......Charleston, S. C.
H. A. Ulmo, *M. M*............Savannah, Ga
Charlotte, Columbia & Augusta R. R. (*See Rich. & D.*)
Chateaugay R. R. 3 g. 34 m. 8 lo. 380 cars.
A. L. Inman, *Gen. Man*..... Plattsburg, N. Y.
J. M. Davies, *Supt*.......Lyon Mountain, N. Y.
M. L. French, *Asst. Supt*.... Plattsburg, N. Y.
Chatham Ry. 4-8½ g. 9 m.
J. B. Snowball, *Man*............Chatham, N. B.
Chattaroi Ry. 4-8½ g. 51 miles 11 loco. 483 cars.
F. H. Oliphant, *Gen. Man. & P. A*. Ashland, Ky.
J. R. Martin, *M. M*............Ashland, Ky.
Joseph P. Burleigh, *M. C. B*.....Ashland, Ky.
Cheraw & Chester R. R. (*See Rich. & Dan.; (2) Div.*)
Cheraw & Darlington R. R. (*See Wil. & Wel.*)
Cheraw & Salisbury R. R. (*See Wil. & Wel.*)
Cherokee R. R. (*See East & West.*)
Cherry Valley R. R. 4-8½ g. 6 m. 3 lo. 6 cars.
E. T. Herndon, *Supt*............Midland, Mo.
Chesapeake, Ohio & South-Western.
4-9 g. 398 m. 62 lo. 1,345 c.
Jas. L. Frazier, *Supt*............Louisville, Ky.
H. E. Huntington, *Pur. Agt*.....Louisville, Ky.
J. A. Dew, *Mast. Trans*............Paducah, Ky.
R. H. Briggs, *Supt. M. P*............Paducah, Ky.
D. L. Weaver, *M. M*......Elizabethtown, Ky.
Jno. Fitzgerald, *M. M*............Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 169 l. 5,120 c.
C. W. Smith, *Gen. Man*............Richmond, Va.
D. A. Sweet, *Asst. to Gen. Man*. Richmond, Va.
A. S. Emmons, *Pur. Agt*............Richmond, Va.
T. L. Chapman, *Supt. M. P*.......Richmond, Va.
Eastern Div.: A. H. Wood, *Supt*..Richmond, Va.
J. N. King, *M. C. B*............Richmond, Va.
J. B. Pierce, *M. M*............Richmond, Va.
Hunt. Div.: W. B. Ryder, *Supt*....Hinton, W. Va.
W. H. Thomas, *M. M*...Huntington, W. Va.
H. C. Bassinger, *M. C. B*. Huntington, W. Va.
Lex. Div.: J. D. Yarrington, *Supt*..Lexington, Ky.
S. R. Tuggle, *M. M*............Lexington, Ky.
K. C. Div.: G. W. Bender, *Supt*..Covington, Ky.
W. T. Smith, *M. M*............Covington, Ky.
Cheshire R. R. 4-8½ g. 80 m. 31 lo. 531 cars.
R. Stewart, *Gen. Man*............Keene, N. H.
H. H. Stone, *Pur. Agt*............Keene, N. H.
F. A. Perry, *M. M*............Keene, N. H.
A. E. Howard, *M. C. B*............Keene, N. H.
Chester & Lenoir Ry. (*See Rich. & Dan.; (3) Div.*)
Chicago, Bur. & Kan. City Ry. (*See C. B. & Q.*)
Chicago, Burlington & Quincy R. R.
4-8½ g. 3,608 m. 545 lo. 21,012 cars.
H. B. Stone, *Gen. Man*............Chicago, Ill.
(1) C., B. & Q., East of Mo. Riv.
J. D. Besler, *Gen. Supt*............Chicago, Ill.
Wm. Irving, *Gen. Pur. Agt*........Chicago, Ill.
G. W. Rhodes, *Supt. M. P*.........Aurora, Ill.
Wm. Forsyth, *Mech. Eng*............Aurora, Ill.
Ill. Divs.: C. F. Resseguie, *Supt*....Galesburg, Ill.
Chi. Div., Geo. Alexander, *Supt*.....Aurora, Ill.
L. E. Johnson, *M. M*............Aurora, Ill.
Galesburg Div.: F. C. Rice, *Supt*. Galesburg, Ill.
Robert Colville, *M. M*............Galesburg, Ill.
St. L. Div.: W. C. Brown, *Supt*..Beardstown, Ill.
A. Forsyth, *M. M*............Beardstown, Ill.
Ia. & Mo. Divs.: W. F. Merrill, *Supt*. Burlington, Ia.
East. Div.: O. E. Stewart, *Supt*..Burlington, Ia.
Joel West, *M. M*............Burlington, Ia.
Mid. Div.: J. B. Maxon, *Supt*.....Ottumwa, Ia.
West'n Div.: J. H. Duggin, *Supt*....Creston, Ia.
C. W. Eckerson, *M. M*............Creston, Ia.
Chi., B. & Kan. C'y and St. L., Keo. & No.-W'n Rys.
Robt. Law, *Gen. Supt*............Keokuk, Ia.
W. H. Bartlett, *M. M*............Burlington, Ia.
(2) C. B. & Q., West of Mo. Riv.
G. W. Holdrege, *Gen. Man*......Omaha, Neb.
C. M. Wead, *Supply Agt*............Omaha, Neb.
D. Hawksworth, *M. M*........Plattsmouth, Neb.
C. M. Wead, *Storek'pr*.......Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
T. E. Calvert, *Gen Supt*............Lincoln, Neb.
D. E. Thompson, *Supt*............Lincoln, Neb.
E. Bignell, *M. M*............Lincoln, Neb.
R. V. Div.: A. Campbell, *Supt*......McCook, Neb.
A. & N. Div.: J. McConniff, *Supt*...Lincoln, Neb
Chicago, Fairchild & Eau Claire R. R.
4-8½ g. 22 m. 4 lo. 28 cars.
N. C. Foster, *Gen. Man*............Fairchild, Wis.
C. I. Wickersham, *Pur. Agt*......Chicago, Ill.
Chicago, Iowa & Dakota Ry. 4-8½ g. 26 m
John Porter, *Gen Man*............Eldora, Ia.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 5,201 m. 626 lo. 19,018 cars.
Roswell Miller, *Gen. Man*....Milwaukee, Wis.
Jos. F. Tucker, *Asst. Gen. M*..Milwaukee, Wis.
J. T. Clark, *Gen. Supt*............Milwaukee, Wis.
A. J. Earling, *Asst. Gen. Supt*. Milwaukee, Wis.
J. T. Crocker, *Pur. Agt*............Milwaukee, Wis.
J. M. Lowry, *Gen. M. M*.......Milwaukee, Wis
E. Fairbairn, *M. M*............Milwaukee, Wis
John Bailie, *Supt. Car Dept*...Milwaukee, Wis
W. E. Kittridge, *M. C. B*......Milwaukee, Wis
(1) C. & M. and C. & C. B. in Ill.:
G. O. Clinton *Supt*............Chicago, Ill.
Ch. & C. B in Ia.:
R. B. Campbell, *Supt*............Marion, Wis
La C. & Wis. Val. Divs.:
W. G. Collins, *Supt*............Milwaukee, Wis
P. du C. & M. Pt. Divs.:
S. J. Collins, *Supt*............Milwaukee, Wis.
(2) C. H. Prior, *Asst. Gen. Supt*..Minneapolis, Minn.
H. & D. Div.: W. M. Kellie, *Supt* do.
J. O. Pattie, *M. M*............Minneapolis, Minn.
Ia. & Minn. Div.: H. R. Williams, *Supt*. do.
S. Minn. Div.: F. D. Underwood, *Supt*. Lacrosse, Wis.
Riv. & Dub. Divs.: C. W. Case, *Supt*. Dubuque, Ia.
S. Charnley, *M. M*............Dubuque, Ia.
Ia. & Da. Div.: G. W. Sanborn, *Supt*. Mason City, Ia.
S. Cy. & Da. Div.: W. J. Underwood, *Supt*. Sioux Cy. Ia.
F. H. Moulton, *M. M*............Yankton, Dak.
J. M. Horan, *For*............Yankton, Dak.
(3) D. A. Olin, *Asst. Gen. Supt*.........Racine, Wis.
R. & S. W. Divs.: D. L. Bush, *Supt*...Racine, Wis.
John Taylor, *M. M*............Racine, Wis
(4) Northern Div.: L. B. Rock, *Supt*. Milwaukee, Wis.
Wm. E. Kittredge, *M. C. B*..Milwaukee, Wis
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 309 lo. 8,367 cars.
R. R. Cable, *Pres. & Gen. Man*....Chicago, Ill.
A. Kimball, *V. P. & Gen. Supt*.....Chicago, Ill.
H. F. Royce, *Asst. G. Supt*.....Davenport, Ia.
F. A. Marsh, *Pur. Agt*............Chicago, Ill.
T. B. Twombly, *Gen. M. M*......Chicago, Ill.
B. K. Verbryck, *Gen. M. C. B*......Chicago, Ill.
Ill. Div.: R. H. Chamberlin, *Supt*.....Chicago, Ill.
R. Biester, *M. M*............Chicago, Ill.
Sam'l Pullman, *M. C. B*............Chicago, Ill.
Ia. Divs.: Jno. Given, *Supt*......Des Moines, Ia.
J. G. Crockett, *M. M*............Stuart, Ia.
Jas. E. Morrill, *M. M*............Davenport, Ia.
Chas. M. Leonard, *M. C. B*......Davenport, Ia.
K. & Des. M. Div.: Jno. Given, *Supt*. Des Moines, Ia.
S. W. Wakefield, *M. M*............Keokuk, Ia.
Henry Kummer, *M. C. B*............Keokuk, Ia.
So.-Wn. Div.: G. F. Walker, *Supt*....Trenton, Mo.
R. O. Carscadin, *M. M*............Trenton, Mo.
Chas. R. Best, *M. C. B*............Trenton, Mo.
Chicago, Saginaw & Canada R. R. (*See Det., L. & N.*
Chicago, St. Louis & New Orleans R. R. (*See Ill. Cen.*
Chicago, St. Louis & Pittsburgh R. R.
4-9 g. 635 m. 202 lo. 3,510 cars.
James McCrea, *Manager*............Columbus, O.
Wm. Mullins, *Gen. Pur. Agt*...Pittsburgh, Pa
Edward B. Wall, *Supt. M. P*....Columbus, O.
1, 3 & 5 Divs.: J. F. Miller, *Supt*. Richmond, Ind.
Robert Curtis, *M. M*............Columbus, O
J. L. Copeland, *G. F Car Shops*. Columbus, O
Wm. Swanston, *M. M*......Indianapolis, Ind.
W. C. Arp, *Gen. For*.......Indianapolis, Ind.
2 & 4 Divs.: Chas. Watts, *Supt*. Logansport, Ind.
W. W. Reynolds, *M. M*......Logansport, Ind.
Chas. H. Starr, *G F C. Shops*. Logansport, Ind.
Chicago, St. Louis & Wn. R. R. 4-8½ g. 152 m. 11 lo. 1,799 c.
F. E. Hinckley, *Gen. Man*............Chicago, Ill
B. T. Lewis, *Pur. Agt*............Chicago, Ill.
A. H. Crocker *Supt*............Streator, Ill
J. N. Chilson, *M. C. B*............Streator, Ill.
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,301 m. 181 lo. 5,459 cars.
J. M. Whitman, *Gen. Supt*......St. Paul, Minn.
W. H. S. Wright, *Pur. Agt*......St. Paul, Minn.
Matt. Ellis, *M. M*............St. Paul, Minn.
J. J. Ellis, *Asst. M. M*............St. Paul, Minn.
H. L. Preston, *M. C. B*............Hudson, Wis.
Ea. & No. Div.: A. A. Hobart, *Supt*. St. Paul, Minn.
St. Paul and Sioux City Div.:
H. Spencer, *Supt*............St. James, Minn.
H. C. Anderson, *Asst. M. M*....Sioux Cy, Ia.
Neb. Div.: Jas. McCabe, *Supt*......Omaha, Neb.
Chicago & Alton R. R. 4-8½ g. 849 m. 213 lo. 6,168 c.
C. H. Chappell, *Gen. Man*............Chicago, Ill.
T. M. Bates, *Supt. of Trans*...Bloomington, Ill.
A. V. Hartwell, *Pur. Agt*............Chicago, Ill.
Wm. Wilson, *Supt. of Mach*...Bloomington, Ill.
Jos. Townsend, *G. For. Car Dept*. do.
Chi. Div.: A. M. Richards, *Supt*. Bloomington, Ill.
St. L. & K. C Div.: S. D. Reeves, *Supt*. Roodhouse, Ill.
L. H. Miller, *M. M*............Slater, Mo.
Chicago & Atlantic Ry. 4-8½ g. 269 m.
F. Broughton, *Gen. Man*............Chicago, Ill.
J. H. Parsons, *Supt*............Chicago, Ill.
C. J. Domville, *M. M*............Huntington, Ind.
Chi. & East'n Ill. 4-8½ g. 252 m. 56 lo. 3,870 cars.
O. S. Lyford, *Gen. Supt*............Chicago, Ill.
D. R. Patterson, *Pur. Agt*............Chicago, Ill.
P. W. Drew, *M. Trans*............Chicago, Ill.
Allen Cooke, *M. M*............Danville, Ill.
Chicago & Grand Trunk Ry. (*See Grand Trunk.*
Chicago & Great Southern Ry.
4-8½ g. 124 m. 4 lo. 122 c.
Geo. C. Kimball, *Rec*............Attica, Ind.
H. Crawford, Jr., *Supt*............Chicago, Ill.
Chicago & Iowa R. R. 4-8½ g. 104 m. 18 lo. 237 cars.
T. J. Potter, *Gen. Man*............Chicago, Ill.
W. H. Holcomb, *Gen. Supt*........Rochelle, Ill.
H. S. Bryan, *M. M*............Aurora, Ill.
Chicago & Northwestern Ry.
4-8½ g. 3,761 m. 647 lo. 21,200 cars.
Marvin Hughitt, *2d V. Prs. & G. M*. Chicago, Ill
C. C. Wheeler, *Gen. Supt*............Chicago, Ill
R. H. McCullough, *Ass't Gen. Supt*. Chicago, Ill.
R. W. Hamer, *Pur. Agt*............Chicago, Ill.
Geo. W. Tilton, *Supt. M. P. & M.*; and
W. A. Scott, *A. Supt. M. P. & M*...Chicago, Ill
Wis. Div.: Ed. J. Cuyler, *Supt*......Chicago, Ill.
Gal. Div.: Chas. Murray, *Supt*....... Chicago, Ill.
Pen'a Div.: W. F. Fitch, *Supt*.....Escanaba, Mich.
J. Symons, *M. M*............Escanaba, Mich.
Mad. Div.: C. A. Swineford, *Supt*..Baraboo, Wis.
H. D. Page, *M. M*............Baraboo, Wis.
Minn. & Dak. Divs.: S. Sanborn, *Asst. Gen. Supt*.
Wis., St. P. & Dak. Div.:
W. A. Scott, *M. M*............Winona, Minn.
Dak. Cen. Ry.: J. S. Oliver, *Supt*....Huron, Dak.
Ia. Div.: H. G. Burt, *Supt*............Boone, Ia.
Geo. W. Lowe, *M. M*............Clinton, Ia.
No. Ia. Div.: M. Hopkins, *Supt*...Eagle Grove, Ia.
Win. & St. P. Div.:
W. P. Cosgrave, *Supt*............Winona, Minn.
Wm. Smith, *M. M*............Winona, Minn.
Chicago & West Michigan:
4-8½ g. 409 m. 47 lo. 1,629 cars.
J. B. Mulliken, *V. P. & G. Man*. Muskegon, Mich.
J. K. V. Agnew, *Gen. Supt*. Grand Rapids, Mich.
Allen Bourne, *Pur. Agt*............Detroit, Mich.
W. F. N. Davis, *M. M*............Muskegon, Mich.
Chicago & West'n Ind. R. R. 4-8½ g. 50 m. 12 lo. 150 c.
James D. Carson, *Gen. Man*......Chicago, Ill.
R. W. Johnson, *M. M*............Chicago, Ill.
Cincinnati, Columbus & Hocking Val. Ry.
4-9 g. 25 m. 2 lo. 77 cars.
D. P. Hyatt, *Gen Man*............Dayton, O.
Cin., Georgetown & Portsmouth. 3 g. 35 m. 3 lo. 45 c.
M. Simmons, *Supt*............Cincinnati, O.
F. Enler, *M. M*............Cincinnati, O.
Cincinnati & Green River Ry. 5 g. 17 m. 2 lo. 50 c.
G. B. Harper, *Supt*............Yosemite, Ky.
F. S. Biggs, *M. M*............Yosemite, Ky
Cin., Hamilton & Dayton R. R. 4-9 g. 352 m. 92 l. 2,932 c.
W. F. Stark, *Asst. Supt*............Cincinnati, O.
John Black, *Gen. M. M*............Lima, O
W. H. H. Allison, *M. C. B*........Cincinnati, O.
Cincinnati, Hamilton & Indianapolis R. R.
4-8½ g. 98 m.
C. J. Hepburn, *Supt*............Cincinnati, O
Day. & Mich. Div.:

BENJAMIN ATHA, Treasurer. RICHARD VOSE, President. D. P. CLARK Supt.

We make our own Steel for Car Springs.

Spring Manufactory and Steel Works, Newark, N. J.


NEWARK STEEL WORKS
NATIONAL CAR SPRING CO.
DEMAREST N.Y.

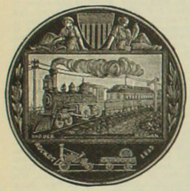
The Largest Crucible Cast-Steel Works in the Eastern States.

NATIONAL CAR SPRING COMPANY,

MANUFACTURERS OF

Elliptic, Volute-Spiral Hebbard, Oval, Round Bar, Rectangular-Passenger & Freight Car Springs

OFFICE, 13 BARCLAY STREET, NEW YORK.



THE HOPKINS

PERFECTLY SELF-FITTING

JOURNAL BEARINGS,

FOR CARS AND LOCOMOTIVES.

NATIONAL EXPOSITION OF RAILWAY APPLIANCES. AWARDED TO D. A. HOPKINS FOR BEST CAR JOURNAL BEARINGS. CHICAGO 1883.

D. A. HOPKINS, 113 Liberty Street, New York,

Patentee and Manufacturer, Holds Himself Responsible for and Guarantees all Bearings Sold by Him.

The Premium for the Best Bearings was awarded to him at the late Chicago Exposition. Orders respectfully solicited and very promptly filled by the patentee.

All parties are hereby cautioned against the purchase or use of self-fitting Journal Bearings unless procured from said Hopkins, or from manufacturers duly licensed by him, whether said bearings purport to be lined with pure lead or not, and whether the lining is secured to the hard metal part of the bearing by soldering or by any other means; also, whether the lining of such bearings is thick or thin, or whether it is made smooth or presents ridges or projections on the journal side of the bearing for receiving the initial pressure of the journal. (See Hopkins' patent, Nov. 15, 1870, and that of Oct. 16, 1883. Re-issued Dec. 18, 1883.)

THE

PFLUG PLATIN PAINT.

A NEW OIL PAINT,

WARRANTED FREE FROM

Barytes, Chalk, Plaster and other Admixtures;

OF EXTRAORDINARY COVERING CAPACITY.

And Unequalled in its efficiency against deleterious Vapors, Dampness and Rust, for Wooden and Iron Bridges, Metal Roofs, Fences, Houses, Stations, Water Pipes, Telegraph and Lamp Posts, Railings, Ships, Smoke Stacks, Water Tanks, Wharves, Stone and Wooden Foundations, Locomotives, Railway Ties, etc.

COST.—Considering its great covering capacity, not more expensive than ordinary Oil Paint.

Best of references from prominent European Railroads after using 10 years. Send for sample. Satisfaction guaranteed.

L. W. MORRIS & SON,

SOLE AGENTS,

18 and 20 Broadway, in Welles Building,
NEW YORK.

CLEVELAND TWIST DRILL CO. 24-26 WEST ST. CLEVELAND, O.
101 CHAMBERS ST. NEW YORK.

GEO. E. SACKETT, Pres. J. T. WRIGHT, Supt

New Albany Steam Forge,

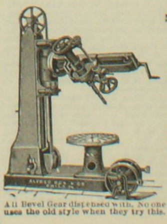
MANUFACTURERS OF

STANDARD CAR AXLES.

AND

LOCOMOTIVE AXLES

Crank Pins, Equalizers, Slide-Bars, Connecting, Parallel and Piston Rods. Heavy Forgings of all Kinds of Iron and Steel.
Office and Works, New Albany, Ind.



All Bevel Gear dispensed with. No one uses the old style when they try this.

ALL SIZES OF CHAIN TO RUN IN SPOCKET WHEELS.

NORTHERN LIBERTY WORKS.

ALFRED BOX & CO.,

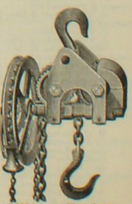
MANUFACTURERS OF

Double Screw Hoists, Radial Drills.

ELEVATORS, ETC.

(Awarded Three Silver Medals and Five Diplomas.)

314 & 316 Green Street,
PHILADELPHIA, PA



2,000 in use. They have
equ

Cincinnati, Indianapolis, St. Louis & Chicago Ry.
4-8½ g. 384 m. 71 lo. 3,279 cars.
J. W. Sherwood, *Supt*. ....Indianapolis, Ind.
Geo. Tozzer, *Pur. Agt*............Cincinnati, O.
J. S. Patterson, *M. of Mach. & M. C. B.* Cincinn., O
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 846 m. 123 lo. 3,464 cars.
John C. Gault, *Gen. Man*........Cincinnati, O
Richard Carroll, *Gen. Supt*.......Cincinnati, O.
R. W. Healey, *Gen. Pur. Agt*.....Cincinnati, O.
James Meehan, *S. M. P. & M*... Cincinnati, O.
Cin. So. Div.: W. W. Wells, *Supt*..Somerset, Ky.
J. L. Tomlinson, *Asst. S. M. P*.. Ludlow, Ky
John Richardson, *M. C. B*.... .Cincinnati, O.
A. Thomson, *M. M*......Chattanooga, Tenn.
Ala. Gr. S'n Div.: D. McLaren, *Supt*., and
George Manuell, *M. M*...,Chattanooga, Tenn
J. M. Kelly, *M. C. B*.....Chattanooga, Tenn.
V. & M. Div.: E. F. Raworth, *Supt*., and
M. M.....Vicksburg, Miss.
V. S. & P. Div.: M. S. Belknap, *Supt*. Monroe, La.
W. Bell Smith, *M. M. & C. B*.....Monroe, La.
New Orleans & North-Eastern R. R.
Edmund L. Tyler, *Supt*.....New Orleans, La.
I. W. Fowle, *M. M*.............Meridan, Miss.
Cincinnati Northern Ry.
Geo. L. Barringer, *Gen. Man* ...Cincinnati, O.
Cincinnati, Richmond & Chicago R. R. 4-9 g. 37 m.
C. J. Hepburn, *Supt*..............Cincinnati, O.
Cincinnati, Selma & Mobile R. R. 5 g. 71 m. 6 lo. 148 c.
A. McCollister, *Supt*................Selma, Ala.
H. L. Wright, *Pur. Agt*.............Selma, Ala.
J. M. Levis, *M. M*... ....Marion, Ala.
Cincinnati, Van Wert & Michigan R. R.
4-9 g. 94 m. 8 lo. 168 cars.
E. Garrison, *Supt*...............Van Wert, O.
D. R. Ennis, *Pur. Agt*.... ....Van Wert, O.
H. H. Garr, *M. M. & M. C. B*......Van Wert, O.
Cin., Wabash & Mich. Ry. 4-8½ g. 165 m. 13 lo. 402 c.
Norman Beckley, *Gen. Man. & P. A.* Elkhart, Ind.
O. W. Lamport, *Supt*............Wabash, Ind.
S. B Tinker, *M. M. & M. C. B* ...Wabash, Ind
Cin., Wash. & Balt. 4-8½ g. 312 m. 65 lo. 1,889 cars
Jas. H. Stewart, *Gen. Man*.......Cincinnati, O.
Edw. Evans, *M. M* ....Chillicothe, O.
T. G. Duncan, *Supt. Car Dept*.......Zaleski, O.
Cincinnati, Wheeling & New York R. R. 4-8½ g. 13 m.
T. M. Atkinson, *Gen. Man*.........Batesville, O.
Cincinnati & Eastern Ry. 3 g. 68 m. 6 lo. 133 cars.
4-8½ g. 50 m. 3 lo.
S. Woodward, *Rec* .... .Cincinnati, O.
G. H. Wilber, *Gen. Sup. & Pur. Agt*. Cincinnati, O.
A. Donaldson, *M. M*.. ....Newtown, O.
P. W. Naughton, *M. M*. ....Batavia, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
John V. Patton, *Gen. Man*.... .Newport, Ky.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 45 cars.
A. H. Kunst, *Pres. & Gen. Man*. Weston, W. Va.
Sam. A. Steel, *M. M*...........Weston, W. Va.
F. Dillie, *M. C. B*........ .. ....Nottingham, O.
Cleveland, Columbus, Cincinnati & Indianapolis & St Louis Rys. and Dayton & Union R. R.
4-8½ g. 785 m. 246 lo. 7,988 cars.
E. B. Thomas, *Gen. Man*.........Cleveland, O.
J. L. Yale, *Pur. Agt*.......... ....Cleveland, O.
W. F. Turreff, *Gen. M. M*........Cleveland, O.
Col. & Cin. Div.: Robt. Blee, *Supt* .Cleveland, O.
Wm. Garstang, *M. M*..........Cleveland, O.
A. G. Steinbrenner, *G. For. Car Dept*. do.
Ind'p'lis Div.: John O. Ewan, *Supt*..Ind'polis, Ind
T. W. Ranson, *M. M*. .....Brightwood, Ind.
N. Mark, *G. For. Car Dept*. Brightwood, Ind.
Ind. & St L Ry.: Tho. Burrows, *Supt*. St. Louis, Mo.
T. W. Ranson, *M. M. & C. B*. Brightwood, Ind.
Day. & Un. Rd.: J. H. Barrett, *Supt*...Dayton, O.
H. S. Gordon, *For. M. Shops* ......Dayton, O.
Clevel'd, Delphos & St. Louis R. R. 3 g. 56 m. 3 lo. 39 c.
I. H. Burgoon, *Gen. Man*..........Delphos, O.
B. F. Marshall, *M. M*..............Delphos, O.
Cleveland, Indiana & St. Louis R. R.
4-8½ g. 19 m. 2 lo. 20 cars.
J. A. Larned, *Rec. & Supt*......Anderson, Ind.
Cleveland, Mt. Vernon & Delaware R. R.
4-9 g. 144 m. 24 lo. 886 c.
N. Monsarrat, *Gen Supt*.............Akron, O.
G. M. Taylor, *M. M. & C. B*.....Mt. Vernon, O.
Cleve., Youngstown & Pitts. R. R. 3 g. 30 m. 3 lo. 138 c.
D. T. Lumley, *Gen. Supt*.. ....Alliance, O.
C. H. Dorman, *M. M. & M. C. B*....Alliance, O.
Cleveland, Lorain & Wheeling Ry.
4-8½ g. 158 m. 31 lo. 1,878 cars.
Oscar Townsend, *Gen. Man* ......Cleveland, O.
Wm. Thornburg, *Supt*......... ...Lorain, O.
C. H. Waburton, *M. M*.... ....Lorain, O.
A. Warburton, *Gen. For*............Lorain, O.
Cleve. & Marietta R. R. (*See Wheel. & Lake Erie.*)
Cleveland & Pittsburgh. (*See Penna. Co.; (4) Div.*)
Clifton & Port Hudson R. R. 4-8½ g. 22 m. 3 lo. 12 c.
John Bradley, *Supt*........ .New Orleans, La.
W. F. Lockwood, *M. M*.......... ..Clinton La.
E. D. Anderson, *M. M*.........Vicksburg, Miss.
Clove Branch R. R. 4-8½ g. 8 m. 1 lo. 61 cars.
C. L. Kimball, *Supt*...... .Matteawan, N. Y.
W. G. Vanbuskirk, *M. M*...Dutchess Jc., N. Y.
Coburg, Peterborough & Marmora Ry.
5-6 g. 47 m. 5 lo. 255 cars.
Jas. R. Barber, *Gen. Supt*... ....Cobourg, Ont.
Jas. Clark, *M. M*... .... Cobourg, Ont
John Tinney, *M. C. B*...........Cobourg, Ont.
Colorado Central R. R. (*See Un. Pac.; (4) Div.*)
Columbia & Greenville R. R. (*See Rich. & D.; (3) Div.*)
Columbia & Puget Sound R. R. 3 g. 21 m. 7 lo. 114 c.
J. L. Howard, *Gen. Supt*.. San Francisco, Cal.
Columbus, Hocking Valley & Toledo Ry.
4-9 g. 324 m. 90 lo. 7,353 cars.
G. R. Carr, *Gen. Supt*..............Columbus, O
W. M. Greene, *Pur. Agt*..........Columbus, O.
Ira G. Hutchins, *M. M*....... ....Columbus, O.
J. M. Rockafield, *M. C. B*.... ... .Columbus, O.
Tol. Div.: M. T. Seymour, *Supt*......Columbus, O.
Hock. V. Div.: M. P. L. Booth, *Supt*. Columbus, O.
Ohio Riv. Div.: C. D. Norris, *Supt*.......Logan, O.
Columbus & Eastern R. R. In progress
J. E. Redfield, *Pres*....... ...Columbus, Ohio.
Columbus & Maysville Ry. (*See Cin. & East.*)
Columbus & Rome R. R. 3 g. 33 m. 3 lo. 30 cars.
M. E. Gray, *Supt* ... . .Columbus, Ga.
Columbus & Western Ry. 5 g. 89 m. 6 lo. 53 cars
E. A. Flewellen, *Gen. Man*. ...Columbus, Ga.
R. A. Bridges, *M. M* ....Opelika, Ala.
Concord R. R. 4-8½ g. 141 m. 41 lo. 1,264 cars.
H. E. Chamberlin, *Supt. & P. Agt*..Concord, N. H.
J. T. Gordon, *M. M. & C. B*.. .Concord, N. H
Concord & Claremont R. R. (*See Northern of N. H.*
Conn. Riv. and Ver. Val. R. Rs. 4-8½ g. 130 m. 42 lo. 554 c.
J. Mulligan, *Supt. & Pur. Agt*. Springfield, Mass.
W. H. Stearns, *M. M. & M. C. B*..Springfield, Mass.
Conn. & Passumpsic Rivers R. R. (*See Passumpsic*)
Connotton Valley R. R. 3 g. 160 m. 26 lo. 1,036 cars.
Samuel Briggs, *Gen. Man*.... .Cleveland, O.
John Bean, *M. M*.................. .Canton, O.
Cooperstown & Susquehanna Valley R. R.
4-8½ g. 16 m. 2 lo. 14 cars.
Andrew Shaw, *Pres* ....Cooperstown, N. Y.
A. Mumford, *M. M*.........Cooperstown, N. Y.
Corning, Cowanesque & Antrim Ry. (*See Syr., G. & C.*)
Cornwall R. R.. 4-8½ g. 12 m. 5 lo. 166 cars.
J. M. Havard, *G. Supt. & M. M*....Lebanon, Pa.
Levi Blonch, *M. C. B* .. ..Lebanon, Pa.
Cornwall & Lebanon R. R. 4-9 g. 5 m.
J. C. Jennings, *Supt*.......... ...Lebanon, Pa.
Coudersport & Port Allegheny R. R.
3 g. 17 m. 2 lo. 64 cars.
B. A. McClure, *Gen. Supt*.....Coudersport, Pa.
Credit Valley Ry. .4-8½ g. 184 m. 22 lo. 535 cars.
Wm. Whyte, *Gen. Supt*..... ... .Toronto, Ont.
John Macnab, *Pur. Agt*..... ......Toronto, Can.
D. Preston, *Mech. Supt*........ ...Toronto, Can
Crescent Springs Ry. 3 g. 12 m. 2 lo. 50 c.
David Joyce, *Gen. Man* .... Lyons, Ga.
W. R. Bourm, *Asst Gen. Man*. Shell Lake, Wis.
John Devereaux, *Gen. Supt*...Shell Lake, Wis
C. I. Wickersham *Pur. Agt* ......Chicago, Ill.
Ira Wood, *Supt. M. P. & M*...Shell Lake, Wis.
John Blackburn, *M. C. B* .....Shell Lake, Wis
Crooked Creek R. R. 3 g. 9 m. 1 lo. 37 cars.
Walter C. Willson, *Gen. Man*. Webster City, Ia.
Geo. W. Post, *Pur. Agt*............ Lehigh, Ia.

Crown Point Iron Co.'s R. R. 3 g. 13 m. 3 lo. 135 c.
A. L. Inman, *Gen. Man*..... .Plattsburg, N. Y.
H. L. Reed, *Pur. Agt*.......Crown Point, N. Y.
Jas. McMann, *Supt*..........Crown Point, N. Y.
C. W. Sanders, *M. M*.... .. Crown Point, N. Y.
Cumberland Ry. 4-8½ g. 32 m. 1 lo. 64 c.
J. A. Killam, *Gen. Man*..........Parsboro, N. S.
K. McKinnon, *M. M*.............Parsboro, N. S.
Cumberland Valley R. R. 4-9 g. 127 m. 25 lo. 474 cars.
J. F. Boyd, *Supt*...... .....Chambersburg, Pa.
A. S. Hull, *M. M*......... ..Chambersburg, Pa.
C. Wicke, *M. C. B*...... ...Chambersburg, Pa.
Cumberland & Maurice River R. R. 4-8½ g. 20 m.
L. H. Dowdney, *Supt*........Port Norris, N. J.
Cumberland & Penn. R. R. 4-8½ g. 55 m. 28 lo. 625 c.
P. L. Burwell, *Gen Supt & P. A.* Cumberland, Md.
N. W. Howson, *Mast. of Mach*. Mt. Savage, Md.
Nathan Binix, *M. C. B*..... ...Mt. Savage, Md.

D

Danville & New River R. R. 3 g. 43 m. 2 lo. 30 c.
W. T. Sutherlin, *Gen. Man*.......Danville, Va.
W. T. Whittaker, *M. M*............Danville, Va.
Danbury & Norwalk R. R. 4-8½ g. 36 m. 7 lo. 112 c.
C. M. Crawford, *G. Supt. & P. A*..S. Norwalk, Ct.
W. H. Wilkinson, *M. M. & C. B*. Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. M. Shivler, *Supt*...........Leakesville, N. C.
Danville, Olney & O. R. R. R. 4-8½ g. 78 m. 3 lo. 34 c.
C. E. Henderson, *Rec. & Man*........Olney, Ill.
W. A. Bell, *M. M. & C. B*.. .... ..Kansas, Ill
Dayton & Toledo R. R. 3 g. 96 m.
C. E. Henderson, *Gen. Man*...... ..Dayton, O.
J. E. Gimperling, *Supt*...............Dayton, O.
Dayton & Union R. R. (*See Clev., Col., Cin. & Ind.*)
Dayton & Michigan R. R. (*See Cin., Ham. & Day.*)
Dayton & Ironton R. R.
C. E. Henderson, *Gen. Man*. Indianapolis, Ind.
H. C. Norton, *Pur. Agt*... .Indianapolis, Ind.
E. Heisrodt, *Supt. Mach*..... .....Dayton, O.
Del. Lackawanna & W. and N. Y., Lack. & W. R. Rs.
4-8½ g. 930 m. 436 lo. 31,989 cars.
Wm. F. Halstead, *Gen. Supt*.. ...Scranton, Pa.
G. W. B. Cushing, *Pur. Agt*....New York, N. Y.
Walter Dawson, *Mast. of Mach*...Scranton, Pa.
Robt. McKenna *M. C. B*... .Scranton, Pa.
Bloomsb'g Div.: C. Graham, *M. M*..Kingston, Pa.
Utica Div.: A. C. Salisbury, *Supt*....Utica, N. Y.
Thos. Thatcher, *M. M*.............Utica, N. Y.
Morris & Essex Div.; Sussex; P. & D. and C. R. Rs.
A. Reasoner, *Supt*.............Hoboken, N. J.
W. H. Lewis, *M. M*.......... Kingsland, N. J.
J. W. Baker, *Mast. Car Rep*. ....Dover, N. J.
Oswego & Syracuse Div.:
W. K. Niver, *Supt*..............Oswego, N. Y.
Jas. Buchanan, *M. M*.. ......Syracuse, N. Y.
Syracuse, Binghamton & New York R. R.
4-8½ g. 81 m. 20 lo. 598 cars.
W. K. Niver, *Gen. Supt*... ...Syracuse, N. Y.
Jas. Buchanan, *M. M*.........Syracuse, N. Y.
Cayuga Div.: *Supt* Ithaca, N. Y.
Buffalo Div.: T. B. Griffith, *M. M*..Buffalo, N. Y.
Delaware, Maryland & Virginia R. R.
4-8½ g. 101 m. 7 lo. 145 cars.
Tho. Groom, *Supt*..... ....Lewes, Del.
Geo. Messick, *M. M*..................Lewes, Del.
W. H. Virden, *M. C. B*..............Lewes, Del.
Delaware River R. R. 4-8½ g. 20 m. 3 lo. 8 cars.
E. H. Green, *Supt*..........Pedricktown, N. J.
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 634 m. 180 lo. 10,799 cars.
C. F. Young, *Pres. & Gen. Man*. Honesdale, Pa.
H. G. Young, *Asst. Gen. Man*....Honesdale, Pa.
J. White Sprong, *Pur. Agt*.......Albany, N. Y.
R. C. Blackall, *Supt. of Mach*.....Albany N. Y.
Susq. Div.: C. D. Hammond, *Supt*. Albany, N. Y.
Tho. Howard, *M. M*............Oneonta, N. Y.
J. R. Skinner, *M. C. B*. ....Oneonta, N. Y.
Sar. & Ch. Divs.: T. Voorhees, *Supt*...Troy, N. Y.
J. L. Corey, *M. M*... .... . Green Island, N. Y.
Chr. Körner, *M. C. B*.. .. Green Island, N. Y.
Pa. Div.: R. Manville, *Supt & Pur Agt*. and
S. H. Dotterer, *M. M*.... ....Carbondale, Pa.
T. Orchard, *M. C. B*........ Carbondale, Pa.
Denver Circle R. R. 3 g. 12 m. 7 lo. 15 cars
Theo. C. Henry, *Gen. Man*.........Denver, Col.
T. W. Pelham, *Gen. Supt*.........Denver, Col.
Denver, Utah & Pacific R. R. 3 g. 34 m. 4 lo. 171 c.
L. M. Fouts, *Supt*..... ....Denver, Col.
Denver & New Orleans. 4-8½ g. 140 m. 11 lo. 400 c.
C. W. Fisher, *Gen. Man*...........Denver, Col.
Chas. Wheeler, *Pur. Agt*.... .....Denver, Col.
J. H. Kirk, *M. M. & M. C. B*. .. ..Denver, Col.
Denver & Rio Grande Ry. 3 g. 1,317 m. 222 lo. 5,932 c.
W. S. Jackson, *Rec*.................Denver, Col.
C. M. Hobbs, *Pur. Agt* ... .Denver, Col.
N. W. Sample, *Supt. M. P. & M* ...Denver, Col.
(1) Col. & N. M. Div.: R. E. Ricker, *G. S.* Denver, Col
1st Div.: W. W. Borst, *Supt*.......S. Pueblo, Col.
2d Div.: Cole Lydon, *Supt*..... ... Alamosa, Col.
3d Div.: G. W. Cook, *Supt*........Leadville, Col.
4th Div.: R. M. Ridgway, *Supt*.......Salida, Col.
Denver, Rio Grande & Western Ry. 3 g. 369 m.
W. H. Bancroft, *Rec. & Gen. Supt*.,
Salt Lake City, Utah.
A. L. Horner, *Ass't Supt*. Salt Lake City, Utah.
S. C. Smith, *M. M*... ...Salt Lake City, Utah.
Des Moines, Osceola & Southern R. R.
3 g. 100 m. 7 lo. 253 cars
Jas. Donahue, *Supt*............Des Moines, Ia.
Wm. Persing, *M. M*... ....Osceola, Ia.
Elias Tonet, *M. C. B*.................Osceola, Ia.
Des Moines & Ft. Dodge. 4-8½ g. 144 m. 13 lo. 350 c.
C. N. Gilmore, *Supt*.............Des Moines, Ia.
John McGrayel, *M. M*......Grand Junction, Ia.
E. A. Avery, *M. C. B* ....Grand Junction, Ia.
Det., Bay City & Alpena R. R. 3-2 g. 48 m. 5 lo. 227 c.
Milo Eastman, *Supt*..... ... East Tawas, Mich.
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c
John B. Mulliken, *Gen. Man*......Detroit, Mich.
Allan Bourn, *Pur. Agt*............Detroit, Mich.
Thos. M. Fish, *Gen. Supt*...........Ionia, Mich.
G. C. Watrous, *M. M. & C. B* ......Ionia, Mich.
Det., Mack. & Marq. R. R. 4-8½ g. 152 m. 16 lo. 1,112 c.
D. McCool, *Gen. Supt*... .....Marquette, Mich.
W. J. Tench, *Pur. Agt*........Marquette, Mich.
John B. Wilson, *Mech. Supt*....Marquette, Mich.
Dorchester & Delaware R. R. (*See Penna. (4) Del. Div.*)
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, *Supt*...............Hampton, Ia.
W. S. Couch, *Pur. Agt*......... .Dubuque, Ia.
Duck River Valley R. R. (*See Nash., Chat. & St. L.*)
Dunkirk, Allegheny Valley & Pittsburgh R. R.
4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, *Gen. Supt*.............Dunkirk, N. Y.
R. C. Moore, *Pur. Agt*...... .New York, N. Y.
J. C. Haggett *M. M. & C. B*.....Dunkirk, N. Y.

E

East Alabama Ry. 5 g. 22 m. 3 lo. 19 cars.
W. W. Barnes, *Supt*...............Opelika, Ala.
East Broad Top R. R. 3 g. 30 m. 7 lo. 260 cars.
A. W. Sims, *Supt* ....Orbisonia, Pa.
A. W. Greenwood, *M. M*.... ....Orbisonia, Pa.
East St Louis & Carondelet Ry. 4-9 g. 4 lo. 27 c.
Joseph Hill, *Gen. Supt*......East St. Louis, Ill.
East Tenn. & Western North Car. R. R.
3 g. 34 m. 3 lo. 73 cars.
Thomas E. Matson, *Supt*..Elizabethton, Tenn.
East Tennessee, Virginia & Georgia R. R.
5 g. 1,453 m. 166 lo. 3,670 cars.
Henry Fink, *Rec*...............Knoxville, Tenn
C. H. Hudson, *Gen. Man*......Knoxville, Tenn.
J. F. O'Brien, *Asst. Gen. Man*. Knoxville, Tenn.
J. E. Wilcox, *Pur. Agt*. ......Knoxville, Tenn.
East Tenn. Div. and No. Car. and Ohio Branches.
F. K. Huger, *Supt*...........Knoxville, Tenn.
B. J. Sitton, *M. M*..... ......Knoxville, Tenn.
Jos. Armbruster, *M. C. B*....Knoxville, Tenn.
Alabama Div.: J. M. Bridges, *Supt*...Selma, Ala.
Simon Gay, *M. M*. .. .. Selma, Ala.
W. W. Pierce, *M. C. B*. ....Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, Jr., *Supt*..... Memphis, Tenn
H. N. Burford, *M. M*... ......Memphis, Tenn
Georgia Div.: J. W. Fry, *Supt*......Atlanta, Ga.
J. E. Mallory, *Ass't Supt*..... ....Macon, Ga.
W. A. Walden, *M. M*........ ....Atlanta, Ga.
J. H. Perkins, *M. C. B*. ....Atlanta, Ga.

East & West R. R. of Ala. 3 g. 110 m. 9 lo. 85 c.
T. J. Nicholl, *Manager* ....Cedartown, Ga.
C. F. West, *M. M. & C. B*... Cedartown, Ga.
Eastern R. R. 4-8½ g. 283 m. 110 lo. 2,268 cars.
Payson Tucker, *Gen. Man*........Boston, Mass.
D. W. Sanborn, *Mast. of Trans*..Boston, Mass.
G. F. Hurd, *Pur. Agt*....... ...Boston, Mass.
Amos Pilsbury, *S. M. P. & M*. ..E. Boston, Mass.
A. M. Waitt, *G. For. Car Dept*.....Salem, Mass.
Con'y Div.: J. W. Sanborn, *Supt*..Wolfboro J., N. H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 160 c.
H. W. Bates, *Man. & Pur. Agt*... Riverton, Ky.
H. W. Crawford, *M. M*....... ..Hunnewell, Ky.
Eastern (Maine) R. R. (*See Maine Central.*)
Eastern Shore R. R. 4-8½ g. 38 m. 3 lo. 9 c.
W. Thompson, *Supt*.... ....Princess Anne, Md.
F. Strattner, *M. M*......... Princess Anne, Md.
Elmira, Cortland & Northern R. R. 4-8½ g
A. A. McLeod, *Gen. Man*.........Elmira, N. Y.
Edw. Mahler, *Pur. Agt*.......... Elmira, N. Y.
Thos Kearsley, *M. M. & M. C. B*. Cortland, N. Y.
Erie & Huron Ry. 4-8½ g. 40 m.
E. O. Bickford, *Gen Man*.........Toronto, Ont.
Erie & Pittsburg R. R. (*See Penna. Co.; (3) Div.*)
Etowah & Deaton's R. R. 3 g. 9 m.
D. M. Rogers, *Gen. Man*...........Etowah, Ga.
Eureka Springs Ry. 4-8½ g. 19 m. 1 lo. 9 cars.
Powell Clayton, *Gen. Man*. Eureka Springs, Ark.
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 125 cars.
B. Gilman, *Gen. Supt & Pur. Agt*..Eureka, Nev.
J. M. Crawford, *M. M*............Palisade, Nev.
A. S. Longley, *M. C. B*....... ...Palisade, Nev.
European & North American R. R. (*See Maine Cen.*)
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c.
H. L. Shepard, *Supt*............Evansville, Ind.
Evansv. & Terre Haute. 4-8½ g. 169 m. 26 lo. 973 c.
D. J. Mackey, *Gen. Supt*...... Evansville, Ind.
John Torrance, *M. M*.... ......Evansville, Ind.

F

Fitchburg R. R., 4-8½ g. 152 m. 100 lo. 3,566 cars.
John Adams, *Gen. Supt*...........Boston, Mass.
F. S. Pratt, *Pur. Agt* ....Boston, Mass.
Orlando Stewart, *Supt. M. P*......Boston, Mass.
J. W. Marden, *Supt. C. Dept*. Charlestown, Mass.
Flint & Pere Marq. 4-8½ g. 346 m. 78 lo. 2,664 cars.
H. C. Potter, *Gen. Man*..... E. Saginaw, Mich.
D. Edwards, *Asst. Gen. Man*..E. Saginaw, Mich
G. G. Cook, *Pur. Agt*.........E. Saginaw, Mich.
Sanford Keeler, *Gen. Supt*..E. Saginaw, Mich.
W. F. Potter, *Supt*. (E. Div.)..E. Saginaw, Mich.
M. V. Meredith, *Supt*. (W. Div.) E. Saginaw, Mich.
T. J. Hatswell, *M. M* ...... .E. Saginaw, Mich.
H. M. Perry, *M. C. B*..........E. Saginaw, Mich.
Florida Ry. & Nav. Co. 5 g. 488 m. 31 lo. 397 c.
D. E. Maxwell, *Gen. Supt*.... Fernandina, Fla.
R. V. Dohoney, *M. M. & C. B* Fernandina, Fla.
Florida Southern Ry. 3 g. 91 m. 6 lo. 96 cars.
Sherman Conant, *Gen. Man*... ...Palatka, Fla.
Jas. D. Hollister, *Supt*............Palatka, Fla.
St. J. & L. Eustis Div.:
W. J. Jarvis, *Supt*.......... .....Ft. Mason, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo. 35 c.
Lawton Caten, *Supt*.. ......Gloversville, N. Y.
G. V. Putman, *M. M*....... Gloversville, N. Y.
Fond du Lac, Amboy & Peoria. 3 g. 30 m. 2 lo. 35 c.
Alonzo Kinyon, *Supt. & P. A*. Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. (*See Minn. & St. L.*)
Franklin & Prov. & Hopkinton. 22 m.
E. T. Logee, *Supt* ....Milford, Mass.
Ft. Madison & No.-West'n Ry. 3 g. 45 m. 4 lo. 121 c.
S. B. Kenrick, *Rec. & Pur. Agt*. Ft. Madison, Ia
I. L. Lamb, *M. M. & C. B*......Ft. Madison, Ia.
Ft. Wayne, Cin. & Louisv. 4-8½ g. 128 m. 10 lo. 250 c.
White Water R. R 4-8½ g. 65 m. 5 lo. 170 cars.
W. W. Worthington, *Gen. Supt*...Ft. Wayne, Ind.
T. H. Haberkorn, *M. M*.........Ft. Wayne, Ind.
Wm. Knight, *M. C. B*..........Ft. Wayne, Ind.
Ft. Worth & Denver City Ry. 4-8½ g. 114 m. 8 lo. 443 c.
C. L. Frost, *Gen. Supt* ......Fort Worth, Tex.
Freehold & New York Ry. 4-8½ g. 15 m. 4 lo. 40 c.
J. E. Ralph, *Supt. & Pur. Agt*. Freehold, N. J.
M. C. Mooney, *M. M*..... .... Freehold, N. J.
C. H. Snedeker, *M. C. B*...... Freehold, N. J.
Fulton County N. G. Ry. 3 g. 61 m. 4 lo. 168 cars.
A. C. Atherton, *Gen. Supt. & P. Agt*. Lewiston, Ill.

G

Gainesville & Dahlonega R. R. 3 g. 15 m.
W. P. Price, *Pres*...............Dahlonega, Ga.
Gainesville, Jefferson & Southern R. R. (*See Cen. of Ga*)
Gal., Harrisburg & San Antonio Ry. (*See Cen. Pac.*)
Galveston, Houston & Hend. R. R. (*See Mo. Pac. (5) Div.*)
Galveston, Sabine & St. Louis Ry.
4-8½ g. 28 m. 2 lo. 33 cars
Brad. Barner, *Gen. Man*..... ..Longview, Tex.
Chas. H. Jewell, *Gen. Supt*.....Longview, Tex.
Geneva, Ithaca & Sayre R. R. (*See Lehigh Val.*)
George's Creek & Cumberland R. R.
4-9 g. 25 m. 6 lo. 212 cars.
J. A. Millholland, *Gen. Man*..Cumberland, Md.
Georgetown & Lane's R. R. 5 g. 36 m. 2 lo. 52 c.
G. W. Earle, *Gen. Supt*......Georgetown, S. C
Georgia R. R. 5 g. 307 m. 42 lo. 1,048 cars.
John W. Green, *Gen. Man*.........Augusta, Ga.
John S. Cook, *M. M*.................Augusta, Ga.
T. M. Preval, *M. C. B*... ....Augusta, Ga.
Georgia Pacific Ry. 5 g. 218 m.
I. Y. Sage, *Gen. Supt*........Birmingham, Ala.
S. H. Purcell, *Div. Supt*.......Greenville, Miss.
G. H. Barnum, *Div. Supt*... ..Columbus, Miss.
Gettysburg & Harrisburg R. R. 4-9 g. 21 m.
W. H. Woodward, *Supt*. Pine Grove Furnace, Pa.
G'd Rap., Newaygo & L. S. R. R. (*See Chic. & W. M.*)
Grand Rapids & Indiana. 4-9 g. 528 m. 56 lo. 2,083 c.
W. O. Hughart, *Gen. Man*. Grand Rapids, Mich.
W. R. Shelby, *Pur. Agt*....Grand Rapids, Mich.
S. D. Bradley, *M. M*...... Grand Rapids, Mich.
No'n Div.: J. M. Metheany, *Supt*. G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, *Supt*. Fort Wayne, Ind.
Grand Southern Ry. of New Brunswick.
4-8½ g. 82 m. 5 lo. 54 cars.
J. N. Greene, *Gen. Man*..... .St. George, N. B.
F. W. Holt, *Supt*............ St. George, N. B.
Thomas Logan, *M. M*...... .St. George, N. B.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
J. C. Simpson, *Supt*.............Carbondale, Ill.
Hugh Smith, *M. M*....... ....Murphysboro, Ill.
O. L. Garrison, *Pur. Agt* ...... St. Louis, Mo.
Grand Trunk Ry. 4-8½ g. 2,332 m. 660 lo. 16,330 c.
Joseph Hickson, *Gen. Man*.. ...Montreal, Can.
Wm. Wainright, *Asst. Gen. Man*. Montreal, Can.
Jno. Taylor, *Gen. Storekeeper*...Montreal, Can.
Herbert Wallis, *Mech. Supt*.....Montreal, Can.
Wm. McWood, *Supt. Car Dept*...Montreal, Can.
J. Harkom, *Ass. Mech. Supt*..Richmond, P. Q.
A. H. Smith, *Ass. Mech. Supt*....Toronto, Ont.
R. Boaz, *Asst. Mech. Supt* .. ..Stratford, Ont.
F. L. Wanklyn, *Loco. Works*...Montreal, Can.
Gt. West'n Div.: Chas. Stiff, *Supt*. Hamilton, Ont.
E. Baines, *Store Kpr*........ ..London, Ont.
C. K. Domville, *Mech. Supt*.. .Hamilton, Ont.
E. Mavor, *Asst. Mch. Supt*... Hamilton, Ont.
J. D. McIlwain, *Asst. Car Dept*..London, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 339 m. 103 lo. 1,191 c.
W. J. Spicer, *Gen. Man*...... Detroit, Mich.
A. B. Atwater, *Supt*. ....Battle Creek, Mich.
J. F. Lorimer, *Storekeeper*.....Detroit, Mich.
H. Roberts, *Mech. Supt*.........Detroit, Mich.
Midland of Can. 4-8½ g. 471 m. 44 lo. 1,423 c.
W. B. Ferguson, *Supt*.......Peterboro, Ont.
J. D. Barnet, *Mech. Supt*... Port Hope, Ont.
Det., Gr. H. & Mil. Ry. 4-8½ g. 189 m. 39 lo. 696 c.
W. J. Spicer, *Gen. Man*... ....Detroit, Mich.
John S. Lorimer, *Storekeeper*....Detroit, Mich.
W. J. Morgan, *Supt*..............Detroit, Mich.
H. Roberts, *Mech. Supt*......Port Huron, Mich.
Green Bay, Winona & St. Paul R. R.
4-8½ g. 250 m. 19 lo. 623 cars.
G. Campbell, *Gen. Man*..*& P. A.* Green Bay, Wis.
A. Fenwick, *M. M*.......... Ft. Howard, Wis.
Green Cove Spring & Melrose R. R. 3 g. 32 m. 1 lo. 11 c.
S. Ackley, *Pres*................Philadelphia, Pa.
Greenwood, Laurens & Spart'g. 5 g. 4 lo.
J. N. Bass, *Supt* ....Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B*..Augusta, Ga.

Greenwich & Johnsonville Ry. 4-8½ g. 15 m. 1 lo. 7 c.
J. H. Thompson, *Supt*.... ...Greenwich, N. Y.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 536 m. 51 lo. 1,400 c.
Webster Snyder, *Gen. Man*..Galveston, Texas.
Jno. W. Thorne, *Pur. Agt*....Galveston, Texas.
W. H. Reilly, *M. M. & M. C. B*..Galveston, Texas.
Gulf, W'n Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 74 c.
M. D. Monserrate, *Supt. & Pur. Agt*. Cuero, Tex.
James Mooney *M. M*....... .. Cuero, Texas.

H

Hannibal & St. Jo. R. R. 4-8½ g. 292 m. 76 lo. 1,906 c.
J. F. Barnard, *Gen. Man* ...... .St. Joseph, Mo.
S. E. Cranco, *Gen. Supt* ... .Hannibal, Mo.
Wm. Irving, *Pur. Agt*... .... Chicago, Ill
N. J. Paradise, *Supt. M. M*... ....Hannibal, Mo.
G. M. Shryock, *M. C. B*..........Hannibal, Mo.
Hanover Branch R. R. 4-8½ g. 8 m. 2 lo. 18 cars.
E. Y. Perry, *Supt*........South Hanover, Mass.
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 10 lo. 140 cars.
H. D. Scott, *Gen. Supt*.........Gettysburg, Pa.
John J. Bingley *M. M*............Hanover, Pa.
Jas. Harthorn, *M. C. B*...........Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 41 m. 3 lo. 45 c.
R. H. Middleton, *Supt*......Boiling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 47 m. 9 lo. 196 c.
O. M. Shepard, *Supt*.... ..... New Haven, Ct.
John Henry, Jr., *Supt. M. P*...Hartford, Conn.
Hartford & Conn. W'n R. R. 4-8½ g. 110 m. 16 lo. 495 c.
John F. Jones, *Supt*....... .. . .Hartford, Ct.
J. C. Barton, *M. M*.................Hartford, Ct.
Hecla & Torch Lake R. R. 4-1 g. 5 m. 5 lo. 165 cars.
W. A. Childs, *Gen. Man*.........Calumet, Mich.
Herkimer, Newport & Poland Ry.
3-6 g. 17 m. 2 lo. 24 cars.
Albert Wilber, *Supt*...........Herkimer, N. Y.
Hobart & Manistee River R. R. 3 g. 9 m. 2 lo. 42 c.
H. W. Marsh, *Supt*. ....Hobart, Mich.
Hot Springs R. R. 3 g. 25 m. 3 lo. 39 cars.
J. N. Conger, *Supt*... ....Hot Springs, Ark.
L. Finlay, *M. M*...................Malvern Ark.
Housatonic R. R. 4-8½ g. 126 m. 23 lo. 879 cars.
W. H. Yeomans, *Supt*...........Bridgeport, Ct.
D. S. Draper, *Pur. Agt*..........Bridgeport, Ct.
N. Slingland, *M. M*............Falls Village, Ct.
J. J. Ferris, *M. C. B*....... ...Falls Village, Ct.
Houston Belt Ry. 4-8½ and 3 gauge 16 miles.
S. L. Werden, *V. P. & Gen. Man*. Houston, Tex.
Houston, East & West Tex. Ry. 3 g. 150 m. 10 lo. 570 c.
Paul Bremond, *Pr. & Pur. Agt*..Houston, Tex.
E. L. Bremond, *Gen. Man*........Houston, Tex.
Ed. Campbell, *M. M*............ Houston, Tex.
C. F. Schelewa, *M. C. B*. ......Houston, Texas.
Houston & Tex. Cen. Ry. 4-8½ g. 750 m. 78 lo. 2,526 c.
J. Waldo, *V. Pr. & Gen. Man*....Houston, Tex.
A. H. Swanson, *Gen. Tr. Man*.....Houston, Tex.
L. C. Noble, *Gen. M. M*...........Houston, Tex.
James McGee, *M. C. B*.. ....Houston, Tex.
So. & Wn. Divs.: M. G. Howe, *Supt*. Houston, Tex.
No. & Ml. Divs.: G. A. Quinlan, *Supt*., and
C. H. Burns, *Asst. M. M*......Corsicana, Tex.
No.-Wn. Div.: Donald Allen, *Supt*.... Waco, Tex.
Humeston & Shenandoah R. R.
4-8½ g. 113 m. 18 lo. 80 cars.
E. C. Murphy, *Gen. Man*...... ...Clarinda, Ia.
M. B. Snyder, *M. M* ....Shenandoah, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 65 m. 18 lo. 318 c.
Geo. F. Gage, *Gen. Man*. .. .Huntingdon, Pa.
Samuel B. Knight, *Pur. Agt*..Philadelphia, Pa.
William Barkla *M. M*...... .....Saxton Pa.

I

Illinois Central R. R. 4-8½ g. 1,928 m. 334 lo. 8,565 c.
E. T. Jeffery, *Gen. Supt* .... .Chicago, Ill
O. Ott, *Pur. Agt*......... ....Chicago, Ill
Henry Schlacks, *Supt. of Mach*....Chicago, Ill.
W. B. Snow, *M. M. Car Works*.....Chicago, Ill
(1) Ill. & Ia. Divs.: C. A. Beck, *Supt*.....Chicago, Ill.
Chic. Div.: T. J. Hudson, *Supt* . ... Cairo, Ill
Wm. Renshaw, *M. M* ....Chicago, Ill.
Mid. Div.: H. L. Frisbie, *Supt*.. .... .Pontiac, Ill.
Spring. Div.: W. Wilkinson, *Supt*. Springfield, Ill.
Wm. Griffin, *M. M*....... . .... .Clinton, Ill.
No'n Div.: J. C. Jacobs, *Supt*..........Amboy, Ill.
J. B. Edams, *M. M*............ ...Amboy, Ill.
Ia. Div.: M. Gilleas, *Supt*....... ... Dubuque, Ia.
Thos. W. Place, *M. M*........ .Waterloo, Ia.
(2) So. Divs.: C. M. Sheafe, *Supt*....New Orleans, La.
La. Div.: J. M. Turner, *Supt*. McComb City, Miss.
W. B. McKenna, *M. M*....McComb City, Miss.
Miss. Div.: J. G. Mann, *Supt*......Jackson, Tenn.
J. F. White, *M. M*........Water Valley, Miss.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, *Rec. & Gen. Man*......Decatur, Ill.
O. E. Grady, *Train Mast*............Decatur, Ill.
Frank Young, *For. Shops*.............Paris, Ill.
Illinois & St. Louis R. R. 4-8½ g. 19 m. 10 lo. 450 c
C. H. Sharman, *Gen. Supt. & P. A.* St. Louis, Mo
D. J. Timlin, *M. M*... ....Belleville, Ill.
Charles Rothe, *M. C. B*..... .. E. St. Louis Ill
Indiana, Bloomington & Western Ry.
4-8¾ g. 826 m. 108 lo. 4,018 cars.
C. E. Henderson, *Gen. Man*. Indianapolis, Ind.
I. H. Wilson, *Gen. Supt* .....Indianapolis, Ind.
H. C. Norton, *Pur. Agt*...... Indianapolis, Ind.
Jos. S. Porter, *Div. M. M*..........Sandusky, O.
B. Warren, *Gen. M. M*........Indianapolis, Ind.
M. Fogarty, *Div. M. M* ....Urbana, Ill.
W. B. Warren, *Div. M. M* ....Indianapolis, Ind.
Indiana, Illinois & Iowa R. R. 4-8½ g. 104 m. 5 lo. 83 c.
F. M. Drake, *Pres*.......... .....Kankakee, Ill.
T. P. Shonts, *Gen. Supt*......... Kankakee, Ill.
R. C. Ackley, *M. M*...............Kankakee, Ill.
Indiana & Illinois Southern Ry. 3 g. 91 m. 3 lo. 69 c.
W. C. Lyon, *Gen. Man. & P. Agt*. Robinson, Ill.
J. S. Pickering, *M. M. & C. B*.. Effingham, Ill.
Indianapolis, Decatur & Springfield Ry.
Geo. Bender, *Supt* ... .Indianapolis, Ind.
M. M.... ......Indianapolis, Ind.
Indianapolis & Evansville Ry. 4-8½ g. 54 m.
D. J Mackey, *Supt* ... .Evansville, Ind.
Indianapolis & St. Louis R. R. (*See C., C., C. & I.*)
Indianapo. & Vincennes R. R. (*See Penna. Co.; (8) Div.*)
Intercolonial Ry. 4-8½ g. 873 m. 163 lo. 4,589 cars.
David Pottinger, *Chief Supt*.....Moncton, N. B.
T. V. Cook, *Gen. Storekeeper*...Moncton, N. B.
H. A. Whitney, *Mech Supt*......Moncton, N. B
Ewd. D. Shaffer, *M. C. B* ....Moncton, N. B.
M. & C. Dist.: J. E. Price, *Supt*. Campbellton, N. B.
Hal. & St. J. Div.: J. J. Wallace, *Supt*..Truro, N. F
Q. & St. F. Div.: A. R. McDonald, *Supt*. Riv. du Lp, Q.
International Ry. 4-8½ g. 69 m. 7 lo. 12 cars.
D. E. McFee, *Supt*............Sherbrooke, P. Q.
J. Ruelle, *M. M*......... .....Sherbrooke, P. Q.
W. Charest, *M. C. B*.........Sherbrooke, P. Q.
International & Gt. N'n R. R. (*See Mo. Pac.; (5) Div.*)
Iowa Falls & Sioux City R. R. (*See Ill. Cen.*)
Iron Mountain & Helena R. R. (*See Mo. Pac.; (4) Div.*)
Ithaca, Auburn & Western Ry. (*See Southern Cen.*)

J

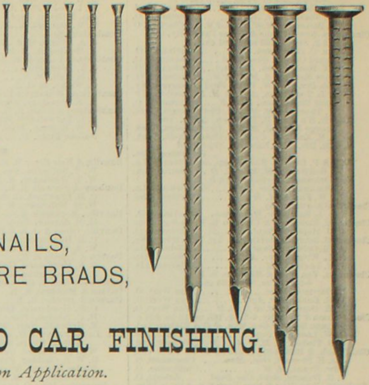
Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 69 c.
E. S. Greenleaf, *Supt*...........Jacksonville, Ill.
Ira F. Petrie, *M. M*............Jacksonville, Ill.
Jacksonville, St. Augustine & Halifax River Ry.
3 g. 76 m. 3 lo. 27 cars
W. L. Crawford, *Gen. Man*..Jacksonville, Fla.
E. T. Silvius, *M. M* ....Jacksonville, Fla.
Jacksonv., Pensacola & Mob. (*See Fla. Cent. & W.*)
Jacksonville, Tampa & Key West Ry. 5 g. 56 m.
G. W. Bentley, *Gen. Man*. ..Jacksonville, Fla.
M. R. Moran, *Supt*...........Jacksonville, Fla.
F. B. Hurlbut, *M. C. B*..... Jacksonville, Fla.
Jamesville & Washington R. R. (*See Norfolk So'n.*)
Jeffersonv'l, Madison & Indpls. R. R. (*See (9) Pa. Co.*)
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, *Manager* ...Jersey City, N. J.
Jersey City & Bergen R. R. 4-10 g. 21 m. 2 lo. 13 c.
T. M. Sayre, *Supt*.............Jersey City, N. J.
Jersey Shore, Pine Creek & Buff. Ry. (*See Phil. & R.*)
Junction & Breakwater R. R. (*See Del., Md. & Va.*

American Wire Nail Co.,

COVINGTON, KENTUCKY,

MANUFACTURERS EXCLUSIVELY OF

WIRE NAILS.



ESTABLISHED 1875.
INCORPORATED 1876.

J. L. STEPHENS, President.

L. H. GEDGE, Vice-President.

B. H. GEDGE, Secretary.

FLAT, OVAL, OR DEPRESSED HEAD.
BLUED, BLACK OR BRIGHT.
BARBED STEEL WIRE NAILS,
AND STEEL WIRE BRADS,
FOR

CAR SIDING, CAR ROOFING AND CAR FINISHING.

Illustrated Catalogue and Price List sent on Application.

VAN DUSEN NUT LOCK.

A Perfect Nut Lock, Cheaper and Better than Jamb Nuts, or even Wooden Washers.

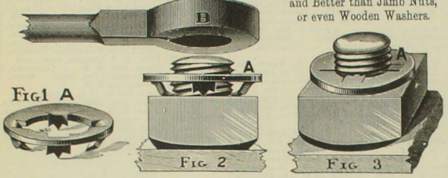


Fig. 1.—*A* represents nut lock detached. Fig. 2.—*A*, nut lock in position, ready to apply; *B*, the tool used in setting the lock—it is simply a bar of iron having a hole ⅛ inch larger than the bolt—when placed as indicated one or two smart blows with a hammer on the tool force the lock flat, the teeth entering the metal of the bolt. Fig 3.—*A* represents the lock applied.

Samples Furnished Free of Cost for Practical Tests. Difficult Tests Preferred.

MANUFACTURED BY

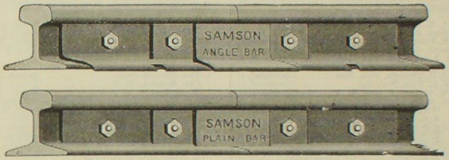
PEERLESS MFG. CO. Works: LOUISVILLE, KY.

Sales Office: 15 Gold Street, New York.

Represented by THOMAS PROSSER & SON.

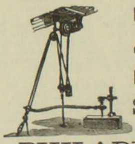
CHICAGO SPLICE BAR MILL.

MORRIS SELLERS & CO., Sole Proprietors and Manufacturers of the Celebrated "SAMSON" BAR



And Every Variety of Plain and Angle Splice Bars.

OFFICE. 6 ASHLAND BLOCK............ Mill, Chicago Ave. and the River .. CHICAGO



PORTABLE Machines for Use by Bridge, Engine and Boiler Makers.

PORTABLE Drilling, Tapping, Boring, and Reaming Machines

PORTABLE Machines for Wood Boring, Polishing, and Emery Wheel Grinding.

STOW FLEXIBLE SHAFT Co., Limited,

1505-1509 PENNSYLVANIA AVENUE,
PHILADELPHIA, - - PA.

THE ADAMS & WESTLAKE MFG. CO.'S IMPROVED LOCOMOTIVE SIGNAL HEAD-LIGHTS.

For displaying Locomotive NUMBERS and COLORED TRAIN SIGNALS at night.

Makers of interior **CAR LAMPS** of latest design; **SWITCH, SIGNAL,** and **TAIL** Lamps; Railway **LANTERNS,** &c., in great variety.

SEND FOR ILLUSTRATED CATALOGUE.

THE ADAMS & WESTLAKE MANUFACTURING CO., CHICAGO.

45 Summer Street, Boston. 100 Beekman Street, New York.

J. McGREGOR ADAMS, President. L. I. TODD, Vice-President. WM. DOW, Secretary. C. A. HITCHCOCK, Supt.

UNION BRASS MANUFACTURING COMPANY.

CHICAGO, ILL.,
MANUFACTURERS OF
CAR HARDWARE.

Special designs furnished for the Interior Decorations of day, night and parlor coaches. Trimmings of every description. Eastern Office, Room 91, No. 115 Broadway, New York

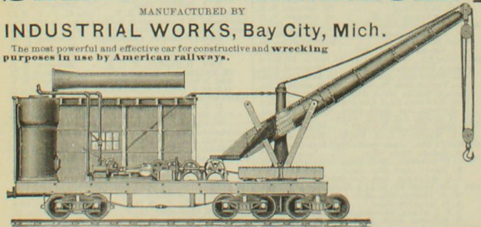
J. E. CROSS. Eastern Agent.

STEAM DERRICK AND WRECKING CAR,

MANUFACTURED BY

INDUSTRIAL WORKS, Bay City, Mich.

The most powerful and effective car for constructive and **wrecking purposes in use by American railways.**



The **CHICAGO & WESTERN INDIANA RAILROAD** (the Belt Railway Co. of Chicago) says of it:

"*Our steam derrick has been in use twenty-nine times from Nov.* 1, 1883, *to Feb.* 1, 1884, *during which we have picked up* 58 *cars* (*box, etc.*), 1 *Pullman sleeper,* 2 *baggage cars and* 13 *engines, at a cost for labor of only* $535.37. *Comparing the difference in cost of repairs to cars or engines handled by this machine with the old manner of clearing track with a switch rope and pulling cars to pieces, we find the derrick has almost paid for itself. The best performance made by the derrick was to raise a* 52-*ton locomotive from its side on to wheels.*"

In use by
Michigan Central Railroad,
Canada Southern Railroad,
Atchison, Topeka & Sante Fe Railroad.

Designs for Derrick Machinery of lesser capacity and Hand-Derrick Cars furnished upon application.

HALE & KILBURN MANUFACTURING COMP'Y,

48 AND 50 NORTH SIXTH STREET, PHILADELPHIA, PA.,

ELASTIC SLAT SEAT.

REFERENCES.
N. Y. C. & H. R. R. CO.
N. Y. ELEVATED R. R.
ILL. CENTRAL R. R.
PULLMAN P. C. CO.
PENN. R. R. CO.
N. Y. & N. ENG'D R. R.
BALT. & O. R. R.
AND ONE HUNDRED OTHERS.

RATTAN SPRING SEAT.

EXTENSIVE MAKERS
OF
PATENTED CAR SEATS
AND
SPRINGS.

SPRING EDGE SEAT.

ESTIMATES,
CIRCULARS
AND
SAMPLES FURNISHED
ON
APPLICATION.

PARLOR CAR CHAIR

K

Kaaterskill R. R. 3 g. 8 m.
J. H. Jones, *Supt*............Rondout, N. Y.
Kansas Central R. R. (*See Union Pacific.*
Kansas City, Fort Scott & Gulf R. R.
4-8½ g. 389 m. 75 l. 2,037 c.
Geo. H. Nettleton, *Gen. Man.*.Kansas City, Mo.
L. W. Towne, *Supt*............Kansas City, Mo.
H. P. Jacques, *Pur. Agt*.....Kansas City, Mo.
J. S. McCrum, *M. M*...........Kansas City, Mo.
A. N. Montier, *M. C. B*.......Kansas City, Mo.
Kansas Cy, Lawrence & So. Kan. (*See At., Top. & S. F.*)
Kansas City, Springfield & Memphis R. R.
4-8½ g. 283 m. 10 lo. 456 cars.
George H. Nettleton, *Pres*....Kansas City, Mo.
L. W. Towne, *Supt*............Kansas City, Mo.
H. P. Jacques, *Pur. Agt*......Kansas City, Mo.
J. S. McCrum, *M. M*...........Kansas City, Mo.
A. N. Montier, *M. C. B*.......Kansas City, Mo.
Kansas City, St. Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ & 3 g. 368 m. 41 lo. 1,148 c.
J. F. Barnard, *Gen. Man*.........St. Joseph, Mo.
J. R. Hardy, *Supt*...............St. Joseph, Mo.
D. H. Winton, *Asst. Supt*........St. Joseph, Mo.
A. B. Barnard, *Asst. Supt*....Kansas City, Mo
Wm. Irving, *Pur. Agt*............Chicago, Ill.
F. A. Chase, *M. M*...............St. Joseph, Mo
Thos. Aylesbury *S. For. Car. Dep.* St. Joseph, Mo
Kansas City & Southern Ry. 4-8½ g. In progress.
Wm. Bailey, *Pres*............Kansas City, Mo.
Kansas Coal Belt R. R. 4-8½ g. In progress.
C. H. Malin, *Gen. Man*...........Girard, Kan.
F. A. Hill, *Supt*.................Girard, Kan.
Kansas & Gulf Short Line R. R. 33 m. 2 lo. 32 cars.
Gen. Man..........Tyler, Tex.
V. K. Stevenson, *Pur. Agt*.....New York, N. Y.
Kent Northern Ry. 4-8½ g. 27 m. 2 lo. 16 cars.
J. C. Brown, *Gen. Man*.....Richibucto, N. B.
Kentucky Central R. R. 4-9 g. 255 m. 28 lo. 640 cars.
H. E. Huntington, *Supt*........Covington, Ky.
W. T. Smith, *M. of Mach*.......Covington, Ky.
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c.
Geo. B. Harper, *Supt. & P. A.*..Mt. Sterling, Ky
Geo. W. Lewis, *M. M*...........Mt. Sterling, Ky.
Keokuk & Des Moines R. R. (*See Chi., R. I. & Pac.*)
Kingston & Pembroke Ry. 4-8½ g. 104 m. 9 lo. 214 c.
B. W. Folger, *Supt*..............Kingston, Ont.
J. H. Taylor, *Pur. Agt*..........Kingston, Ont.
J. H. Taylor, *M. M*..............Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 6 lo. 119 cars.
C. A. Coombs, *Supt*......................Bath, Me.
Wm. A. Field, *M. M*......................Bath, Me.
C. L. Turner, *M. C. B*...................Bath, Me.
Knoxville & Augusta R. R. 5 g. 16 m. 2 lo. 34 cars.
R. N. Hood, *Gen. Man. & P. Agt.* Knoxville, Tenn
J. M. Hood, *Supt*..............Knoxville, Tenn.

L

Lackawanna & Pittsburgh R. R. 3 g. 97 m.
Geo. W. Chapman, *Rec*.........Angelica, N. Y.
Lake Champlain & Moriah R. R. 4-8½ g. 8 m. 8 lo. 222c.
E. B. Hedding, *Supt*..........Port Henry, N Y.
Lake Erie & Western Ry. 4-8½ g. 388 m. 53 lo. 1,701 c.
J. H. Cheney, *Gen. Man*..... Bloomington, Ill.
D. S. Hill, *Gen. Supt*.........Bloomington, Ill.
T. H. Perry, *Pur. Agt*.........Bloomington, Ill.
H. L. Cooper, *Supt. of Equipment*....Lima, O.
Lake George & Muskegon River R. R.
4-8½ g. 20 m. 4 lo. 79 cars.
W. S. Gerrish, *Gen. Man*... Muskegon, Mich.
Lake Shore & Michigan So'n Ry.
4-8½ g. 1,340 m. 547 lo. 17,115 cars.
John Newell, *Pres*................Cleveland, O.
P. P. Wright, *Gen. Supt*..........Cleveland, O.
L. G. Higgins, *Pur. Agt*..........Cleveland, O.
G. W. Stevens, *Supt. M. P*........Cleveland, O.
John Kirby, *Gen. M. C. B*.........Cleveland, O.
East'n Div.: C. B. Couch, *Supt*.....Cleveland, O.
J. S. Graham, *M. M*...............Buffalo, N. Y.
A. C. Robson, *M. C. B*............Buffalo, N. Y.
L. O. Gassett, *M. M*..............Cleveland, O.
J. Withycombe, *M. C. B*...........Cleveland, O.
Frank. Div.: G. H. McIntire, *Supt.* Youngstown, O.
Toledo Div.: Thos. Flesher, Jr., *Supt.* Cleveland, O.
J. M. Sanborn, *M. M*..............Norwalk, O.
W. O. Smith, *M. C. B*.............Norwalk, O.
Mich. Divs.: J. E. Curtis, *Supt*.........Toledo, O.
Det. Brs.: T. J. Charlesworth, *Supt.* Detroit, Mich.
Lansing, Ypsilanti & Ft. Wayne Branches.
W. H. Caniff, *Supt*............Hillsdale, Mich.
Western Div.: A. G. Amsden, *Supt*...Chicago, Ill.
W. L. Gilmore, *M. M*.............Elkhart, Ind.
Frank O. Bray, *M. C. B*..........Adrian, Mich.
Gr. Rap. Br.: M. E. Wattles, *Supt.* Kalamazoo, Mich.
Lake Tahoe R. R. 3 g. 10 m. 3 lo. 49 cars.
D. L. Bliss, *Gen. Man*............Carson, Nev.
John T. Rogers, *Gen. Supt*........Carson, Nev
Tho. Morris, *M. M*................Carson, Nev.
Leavenworth, Topeka & So. W'n Ry. (*See A. T. & S. F.*)
Lebanon Springs R. R. 4-8½ g. 58 m. 5 lo. 44 c.
W. C. Alstyne, *Gen. Man*...........Albany, N. Y.
W. H. Hawkins, *Pur. Agt*...........Albany, N. Y.
Geo. Tefft, *M. M*..................Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 495 m. 392 lo. 36,998 c.
H. S. Goodwin, *Gen. Supt*.......Bethlehem, Pa.
W. C. Alderson, *Pur. Agt*.....Philadelphia, Pa.
John I. Kinsey, *M. M*............So. Easton, Pa.
John S. Lentz, *M. C. B*..........Packerton, Pa.
N. J. Div.: Jas. Donnelly, *Supt.* Perth Amboy, N. J.
Coal Rds.: J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
D. Clark, *M. M*...................Hazleton, Pa.
John Campbell, *M. M*..............Delano, Pa.
B. M. Div.: A. G. Brodhead, *S.* Mauch Chunk, Pa.
P. Hofecker, *M. M*................Weatherly, Pa.
Wy. Div.: A. Mitchell, *S. & M. M.* Wilkesbarre, Pa.
Pa. & N. Y.; and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevenson, *Gen. Supt*..........Sayre, Pa.
J. N. Weaver, *M. M*................Sayre, Pa.
Jno. S. Lentz, *M. C. B*............Packerton, Pa.
Lehigh & Hudson River Ry. 4-8½ g. 63 m. 8 lo. 350 c.
Grinnell Burt, *Gen Man*.........Warwick, N. Y
N. L. Furman, *Supt*.............Warwick, N. Y.
John Sayre, *Pur. Agt*...........Warwick, N. Y.
S. Mills, *M. M*.................Warwick, N. Y.
Lehigh & Lackawanna and Lehigh & Susquehanna R. Rs. (*See Phil. & Read.; N. J. Cen. Div.*)
Levis & Kennebec R. R. (*See Quebec Cen.*)
Litchfield, Carrollton & Western R. R. 4-8½ g. 22 m.
H. S. Carroll, *Prest. & G. Man.*.Carrollton, Ill.
Ligonier Valley R. R. 4-9 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, *Gen. Manager*..Pittsburgh, Pa.
Geo. Senft, *Supt. & P. Agt*........Latrobe, Pa.
Little Miami R. R. (*See Penna. Co.'s Rds.; (8) Div.*)
Little Rock, Miss. River & Texas Ry.
4-8½ g. 170 m. 12 lo. 299 cars.
H. Wood, *Gen Man*...........Little Rock, Ark.
F. A. Lister, *Gen. Supt*.......Little Rock Ark.
F. Hufsmith, *M. M. & C. B.*.......Argenta, Ark.
Little Rock & Fort Smith. 4-8½ g. 170 m. 13 lo. 360 c
Hy. Wood, *Gen. Man*..........Little Rock, Ark.
F. A. Lister, *Supt*............Little Rock, Ark.
F. Hufsmith, *M. M. & M. C. B.*....Argenta, Ark
Little Saw Mill Run R. R. 3 & 4-8½ g. 8 m. 4 lo. 327 c.
T. Hartley, *Gen. Man*..........Banksville, Pa.
Long Island R. R. 4-8½ g. 352 m. 92 lo. 953 cars.
I. D. Barton, *Gen. Supt.* Long Island City, N. Y
Benj. Norton, *Pur. Agt.* Long Island City, N. Y.
C. A. Thompson, *M. M.* Long Island City, N. Y.
Longview & Sabine Valley R. R. (*See Gal. Sab. & St. L.*)
Louisiana W'n R. R. (*See Cen. Pac.; G., H. & S. A. Div.*)
Louisville, Cin. & Lexington R. R. (*See Louis. & N.*)
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 24 lo. 1,032 c.
Geo. F. Evans, *Rec*...........Louisville, Ky.
R. S. Minor, *Gen. Supt*........Louisville, Ky.
F. P. Boatman, *M. M*...........Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 479 miles 60 lo. 3,700 cars.
John B. Carson, *Gen. Man*.........Chicago, Ill
W. R. Woodard, *Gen. Supt*.........Chicago, Ill.
H. O. Nourse, *Pur. Agt*...........Chicago, Ill.
Josiah Bettis, *M. M*..........New Albany, Ind.
Chas. Coller, *M. C. B.*.......New Albany, Ind.
G. C. F. Bent, *Supt. Trans*......Lafayette, Ind.
Louisville, New Orleans & Tex. Ry. 455 m. In progress.
Jas. M. Edwards, *Gen. Man*.....Memphis, Tenn.
M. Burke, *Gen. Supt*...........Memphis, Tenn.
John Bradley, *Asst. Supt*.....New Orleans, La.
A. M. Cooke, *Pur. Agt*..........Memphis, Tenn.
E. D. Anderson, *M. M*..........Vicksburg, Miss.
J. J. Casey, *M. C. B*..........Vicksburg, Miss.
Louisville & Nashville R. R.
5 g. 2,186 m. 380 lo. 12,197 cars.
Reuben Wells, *Gen. Man*........Louisville, Ky.
J. T. Harahan, *Asst Gen. M*....Louisville, Ky.
Geo. F. Evans, *Supt*...........Louisville, Ky.
P. P. Huston, *Pur. Agt*........Louisville, Ky.
Harvey Middleton, *Supt. Mach.*.Louisville, Ky.
Louisv., Cin. & Lex. Divs.;
J. G. Metcalf, *Supt. Trans*.....Louisville, Ky.
P. Leeds, *M. M*.................Louisville, Ky.
J. W. Luttrell, *M. M*...........Louisville, Ky.
J. G. Clifford, *M. M.* (2d & C. Div.). Bowling Grn. Ky.
Henderson Div.: J. Geddes, *Supt.* Henderson, Ky.
W. P. Pike, *M. M*...............Nashville, Tenn.
Nash. & D. Div.: J. Geddes, *Supt.* Nashville, Tenn.
Elkton & Guthrie:
J. Geddes, *Supt*................Nashville, Tenn.
S. & N. A. Div.: Levi Hedge, *Supt.* Birmingham, Ala.
C. W. White, *M. M*.............Birmingham, Ala.
Mob. & M.; N. Div. Pens. & Sel.; Sl. & Mont. R. Rs.:
B. C. Epperson, *Supt*..........Montgomery, Ala.
J. N. Hall, *M. M.* (Mont. Shops). Montgomery, Ala.
N. O. Div.: O. M. Dunn, *Supt*...New Orleans, La.
Wm. Adair, *M. M*...................Mobile, Ala.
Memp. Div.: W. Colcamp, *Supt.* Memphis, Tenn.
J. V. Slusser, *M. M*............Memphis, Tenn.
St. L. Div.: C. O. Parker, *Supt.* Montgomery, Ala.
Thos. Walsh, *M. M*..............Mt. Vernon, Ill.
Pensacola and So. Div. Pens. & Selma and P. & A. Rds.:
E. O. Saltmarsh, *Supt*..........Pensacola, Fla.
W. D. Robb, *M. M*...............Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m. 1 lo. 5 c.
J. H. Wilkins, *Supt. & Pur. Agt.* Louisville, Ga.

M

Macon & Brunswick R. R.
(*See E. Tenn., Vir. & Ga.; At. & Ga. Divs.*)
Maine Central R. R. 4-8½ g. 525 m. 82 lo. 2,168 c.
Payson Tucker, *Gen. Man*........Portland, Me.
Amos Pillsbury, *M. M*...........Waterville, Me.
C. H. Kenison, *M. C. B*.........Augusta, Me.
Eastern Maine. 3 g. 19 m. 2 lo. 40 c.
L. L. Lincoln, *Supt*.............Portland, Me.
Manchester & Keene R. R. 4-8½ g. 30 m. (*See Concord.*)
Manchester & Lawrence R. R. (*See Concord.*)
Manchester & North Weare R. R. (*See Concord.*)
Manhattan Ry. 4-8½ g. 32 m. 228 lo. 652 pass. c.
Frank K. Hain, *Gen. Man*.....New York, N. Y.
W. T. Goundie, *Supt. Trans.*..New York, N. Y.
T. W. Peeples, *M. M*.........New York, N. Y.
H. A. Webster, *M. C. B*......New York, N. Y.
Manitoba Southwestern Colonization Ry.
4-8½ g. 52 m. 3 lo. 125 cars.
J. M. Eagan, *V. Pres*..........Winnipeg, Man.
W. T. Reed, *M. M*..............Winnipeg, Man.
Marietta & Cincinnati R. R. (*See Cin. Wash. & Balt.*)
Marietta & North Georgia R. R. 3 g. 70 m. 4 lo. 45 c.
J. B. Glover, *Gen. Man*.........Marietta, Ga.
W. R. Power, *Pur. Agt*..........Marietta, Ga.
C. Chester, *M. M*...............Marietta, Ga
Marquette, Houghton & Ontonagon R. R.
4-8½ g. 100 m. 42 lo. 2,530 cars.
John Hornby, *Gen. Man*.......Marquette, Mich
W. A. Thompson, *Ass't Supt.* Marquette, Mich.
M. B. McGee, *Pur. Agt*.......Marquette, Mich.
W. A. Mahan, *M. M*...........Marquette, Mich.
H. D. Lyons, *M. C. B*........Marquette, Mich.
Maryland Central R. R. 3 g. 27 m. 4 lo. 56 cars.
S. G. Boyd, *Supt*..............Baltimore, Md.
Marquette & Western. 4-8½ g. 25 m. 10 l. 500 c.
D. McCool, *Gen. Supt*........Marquette, Mich.
W. J. Tench, *Pur. Agt*.......Marquette, Mich.
J. B. Wilson, *Mech. Supt*....Marquette, Mich.
Massachusetts Central R. R. 4-8½ g. 48 m. 5 l. 81 c.
E. G. Allen, *Supt. & Pur. Agt*....Boston, Mass.
E. A. Walker, *M. M*.........So. Sudbury, Mass.
Memphis & Charleston R. R. (*See E. Tenn. Va. & Ga.*
Memphis & Lit. Rock R. R. 5 g. 135 m. 14 lo. 299 c.
R. Fink, *G. Man. & P. A*.....Little Rock, Ark.
H. G. Fleming, *Supt*..........Memphis, Tenn.
Thos. Rennell, *M. M*..........Argenta, Ark.
T. Rennell, *M. C. B*..........Argenta, Ark.
Mexican Ry. 4-8½ g. 293 m. 42 lo. 616 cars.
E. W. Jackson, *Gen. Man*.......Mexico, Mex.
Mexican Central Ry. 4-8½ g. 1,224 m. 94 lo. 2,609 c.
Theo. Nickerson, *Pur. Agt*......Boston, Mass.
D. B. Robinson, *Gen. Man*...El Paso del Norte.
D. MacKenzie, *Gen. Supt*......City of Mexico.
F. W. Johnstone, *Supt. M. P. & M.* City of Mexico.
J. H. O'Brien, *M. M*..........City of Mexico.
G. T. Jarvis, *Div. Supt*......City of Mexico.
A. Smith, *Div. Supt*...............Silao, Mex.
I. A. Eacutt, *Div. Supt*..........Jimulco, Mex.
R. E. Comfort, *Div. Supt.*.Paso del Norte, Mex.
R. S. Simpson, *M. M*..........City of Mexico.
A. Hendee, *M. M*..................Calera, Mex.
C. F. Stewart, *M. M*..............Silao, Mex.
W. L. Wallace, *M. M*.............Jimulco, Mex.
J. G. McCuen, *M. M*.............Chihuahua, Mex.
Tampico Div: E. A. Whorf, *Supt.* Tampico, Mex.
San Blas Div.: C. E. Payne, *Supt.*.San Blas, Mex.
Mexican National Ry. 3 g. 766 m. 50 lo. 1,283 c.
Northern General Division:
D. C. Dodge, *V. P. & Gen. Man*...Laredo, Tex
C. A. Merriam, *Gen. Supt*.......Laredo, Tex.
F. W. Baldwin, *Asst. Gen. Supt*..Laredo, Tex.
John Grace, *M. M*...............Laredo, Tex.
T. Milan, *M. M*.............Corpus Christi, Tex.
Metamoras, Div.:
W. W. Mayberry, *Asst. Supt.*.Brownsville, Tex.
Galveston Div.:
T. E. Quinn, *Asst. Supt*.......Galveston, Tex.
Southern General Division:
W. E. Lewis, *Supt*...............Mexico, Mex.
R. C. Peebles, *Asst. Supt*.......Mexico, Mex.
J. M. Winslow, *M. M*.............Mexico, Mex.
Zacatecas Div.:
C. Langrand, *Manager*.........Zacatecas, Mex.
Michigan Cen. R. R. 4-8½ g. 1,485 m. 357 lo. 11,284 c.
H. B. Ledyard, *Pres. & Gen. Man.* Detroit, Mich.
E. C. Brown, *Gen. Supt*..........Detroit, Mich.
Robert Miller, *Asst. Gen. Supt*...Detroit, Mich.
Allan Bourn, *Pur. Agt*...........Detroit, Mich.
C. E. Smart, *Gen. M. M*..........Jackson, Mich.
(1) Lines West of Detroit River:
E. C. Brown, *Gen. Supt*..........Detroit, Mich.
East Div.: D. S. Sutherland, *Supt.* Detroit, Mich.
Bay City, Saginaw & Mackinaw Divisions.:
W. A. Vaughan, *Supt*...........Bay City, Mich.
C. E. Smart, *M. M*.............Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hav. Divs.:
C. B. Bush, *Supt*.................Jackson, Mich.
W'n Divs.: R. H. L'Hommedieu, *Supt.* Chicago, Ill.
(2) Lines East of Detroit River:
J. B. Morford, *Supt*..........St. Thomas, Ont.
A. F. Bull, *M. M*.............St. Thomas, Ont.
Rob't Potts, *M. C. B.*........St. Thomas, Ont.
Michigan & Ohio.
L. A. Latcha, *Gen. Man*..............Toledo, O.
W. L. Webb, *Pur. Agt*................Toledo, O.
D. J. Durrell, *M. M*..............Marshall, Mich.
Middleburg & Schoharie; and Schoharie Valley R. Rs. 4-8½ g. 11 m. 2 lo. 6 cars.
P. S. Danforth, *Gen. Supt*.....Middleburg, N. Y.
Midland of Canada. (*See Grand Trunk.*)
Midland No. Carolina Ry. 5 g. 95 m. 9 lo. 82 cars.
Atlantic & North Carolina Ry. 22 m.
John D. Whitford, *Gen. Man.*.Newbern, N. C.
J. A. Bryan, *Supt*..............Newbern, N. C
D. J. Sprague, *Pur. Agt*.......New York, N. Y.
B. Manly, *Supt. of Mach*.......Newbern, N. C.
Milford & Woonsocket.
W. W. Jencks, *Supt*...........Milford, Mass.
Milton & Sutherlin. (*Oper. by Rich. & Danville.*)
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 370 m. 45 lo. 1,536 cars.
H. G. H. Reed, *Gen. Supt*......Milwaukee, Wis
J. Donahue, *Supt*..............Milwaukee, Wis.
John Hickey, *M. M*................Ledyard, Wis.
Milwaukee & Northern and Wisconsin & Michigan R. Rds. 4-8½ g. 228 m. 24 l. 703 cars.
C. F. Dutton, *Gen. Supt*.......Milwaukee, Wis.
N. S. Kimball, *M. M*.........Ft. Howard, Wis.
Mineral Range R. R. 3 g. 13 m. 4 lo. 43 cars
Chas. E. Holland, *Pr. & Supt*...Hancock, Mich.
W. H. Carr, *Pur. Agt*...........Hancock, Mich.
T. J. Shellhorn, *M. M. & C. B.*.Hancock, Mich.
Minneapolis, Lyndale & Minnetonka Ry.
3 g. 25 miles 4 motors 1 lo. 35 cars.
William McCrory, *Man*.....Minneapolis, Minn.
T. W. Heintzelman, *M. M*..Minneapolis, Minn.
Minneapolis, S. Ste. Marie & Atlantic Ry.
4-8½ g. 45 m.
W. W. Rich, *Supt*.........Minneapolis, Minn.
Minneapolis & St. Louis Ry.
4-8½ g. 560 m. 72 lo. 2,060 c.
W. H. Truesdale, *V. Pres*..Minneapolis, Minn.
T. E. Clarke, *Gen. Supt*...Minneapolis, Minn.
W. B. Palmer, *Pur. Agent* Minneapolis, Minn.
G. F. Wilson, *M. M. & M. C. B.* Minneapolis, Minn.
Missisquoi R. R. 4-8 g. 28 m.
W. C. Smith, *Man*................St. Albans, Vt.
Mississippi, Terre aux Bœufs & Lake R. R.
29 miles.
M. R. Spelman, *Supt*..........New Orleans, La.
Mississippi & Tenn. R. R. 4-8½ g. 101 m. 12 lo. 194 c.
Jas. M. Edwards, *Gen. Man*....Memphis, Tenn.
J. C. Ramsey, *M. M*...........Memphis, Tenn.
S. J. Bolton, *M. C. B*........Memphis, Tenn.
Missouri, Kansas & Texas Ry. (*See Mo. Pac.; (2) Div.*)
Missouri Pacific Ry. (Leased and operated lines.)
4-8½ g. 6,029 m. 697 lo. 19,748 cars.
H. M. Hoxie, *3d V. Pres*..........St. Louis, Mo.
R. B. Lyle, *Pur. Agt*.............St. Louis, Mo.
(1), (2) and (3) Divs.:
John Hodge, *Supt. Car Dep*.......St. Louis, Mo.
Frank Howard, *Asst. Supt. C. D*...Marshall, Tex.
(4), (5) and (6) Divs.:
O. A. Haynes, *Insp. L. C. & M*...St. Louis, Mo.
(1) Missouri Pacific Ry. 1,028 m. 155 lo. 4,218 cars.
E. K. Sibley, *Supt*................Sedalia, Mo.
E. Taylor, *Asst. M. M*.............Sedalia, Mo.
W'n Div.: A. M. Hagar, *Supt*.......Sedalia, Mo.
L. Bartlett, *M. M*...............St. Louis, Mo.
(2) Mo., Kan. & Tex. Ry. 1,308 m. 140 lo. 4,248 cars.
Jos. Herrin, *Supt*.................Sedalia, Mo.
S. Irvin, *Asst. Supt. Car Dep*.....Sedalia, Mo.
E. K. Sibley, *Supt*...............Parsons, Kan.
W. E. Phillips, *M. M*.............Parsons, Kan.
(3) Central Branch Un. Pac. R. R. 388 m. 30 lo. 599 c.
W. W. Fagan, *Supt*...............Atchison, Kan.
H. V. Faries, *M. M*..............Atchison, Kan.
J. W. Blackburn, *A. Supt. Car D.*.Atchison, Kan.
(4) St. L., I. Mt. & So'n Ry. 905 m. 138 lo. 4,928 c.
Wm. Kerrigan, *Supt*..............St. Louis, Mo.
St. Louis Div.: W. H. Harris, *M. M.*.De Soto, Mo.
Ark. Div.: *Supt*...........Little Rock, Ark.
R. M. Richardson, *M. M*.........LittleRock, Ark.
(5) Int. & G. No.: *Supt*..Palestine, Tex.
M. M..............Palestine, Tex.
(6) Tex. & Pac: Warder Cumming, *Supt.* Marshall, Tex.
E. N. O. & Tr. Cont. Divs.:
Geo. Dimick, *Supt*..............Marshall, Tex.
J. K. Lape, *M. M*...............Marshall, Tex.
E. R. Smith, *M. M. & M. C. B.*.N. Orleans, La.
Rio Grande Div.:
L. L. Keller, *Supt*...........Big Springs, Tex.
J. K. Lape, *M. M*.............Big Springs, Tex.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Wm. H. Pratt, *Trustee*...............Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars
W. L. Clark, *Gen. Supt*...........Columbus, Ga.
J. C. Albrecht, *M. M*.............Columbus, Ga.
A. J. Nix, *M. C. B*...............Columbus, Ga.
Mobile & Montgomery Ry. (*See Louis. & Nash.*)
Mobile & Northwestern R. R. 3 g. 31 m. 2 lo. 16 c.
Thomas T. A. Lyon, *Pres*.......Glendale, Miss.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,353 cars.
T. M. R. Talcott, *V.-Pr. & Gen. Man* Mobile, Ala.
J. G. Motley, *Gen. Supt*............Mobile, Ala.
F. Jordan, *Pur. Agt*................Mobile, Ala.
M. T. Carson, *Gen. M. M*..........Whistler, Ala.
J. T. Booth, *M. C. B*.............Whistler, Ala.
So'n Div.:..............................Mobile, Ala.
L. J. Morris, *M. M*.................Macon, Miss.
No'n Div.: E. S. Hosford, *Supt*...Jackson, Tenn.
H. C. Goode, *M. M*................Jackson, Tenn.
Mobile & Spring Hill R. R. 5-2 g. 8 m. 1 lo. 16 cars.
F. Ingate, *Manager*...................Mobile, Ala.
Moline & Southeastern R. R. 3-6 g. 8 m. 2 lo. 26 c.
R. Battersly, *Gen. Man*.........Coal Valley, Ill.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 8 cars.
G. B. Wiestling, *Supt. & P. A*....Mont Alto, Pa.
Montgomery & Eufaula Ry. (*See Cen. of Ga.*)
Montgomery Southern Ry. 3 g. 20 m. 1 lo. 15 cars.
S. D. Hubbard, Jr., *Gen. Man.* Montgomery, Ala.
Montour R. R. 4-8½ g. 12 m. 2 lo. 130 cars.
C. R. Brown, *Supt. & Pur. Agt*...Imperial, Pa.
Henry Newman, *M. C. B*...........Imperial, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 86c.
W. A. Stowell, *Supt*............Montpelier, Vt.
Montreal Portland & Boston Ry. (*See Passumpsic.*)
Montreal & Sorel Ry. 4-8½ g. 47 m. 3 lo. 35 c.
C. N. Armstrong, *G. M. & Pur. Agt.* Sorel, P. Q.
J. F. Armstrong, *Gen. Supt*.........Sorel, P. Q.
G. W. Pangborn, *M. M*...............Sorel, P. Q.
Montrose Ry. 3 g. 28 m. 3 lo. 24 cars.
T. G. Walter, *Gen. Supt*.... Tunkhannock, Pa.
Morgan's Louis. & Tex. R. R. 4-8½ g. 260 m. 46 l. 1,339 c.
J. Kruttschnitt, *Supt*.........New Orleans, La.
C. Trumpy, *Pur. Agt*...........New Orleans, La.
J. D. Connell, *M. M*..................Algiers, La.
Jno. Hildebrand, *M. C. B*.............Algiers, La.
Mount Washington R. R. 5-3 g. 3 m. 6 lo. 6 cars.
Walter Aiken, *Gen. Man*........Franklin, N. H.

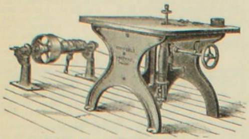
N

Nantasket Beach R. R. 4-8½ g. 6 m. 5 lo. 25 c.
George L. Keyes, *Gen. Supt*......Boston, Mass.
Naugatuck R. R. 4-8½ g. 62 m. 17 lo. 547 cars.
Geo. W. Beach, *Supt*..........Waterbury, Conn.
H. A. Bishop, *Pur. Agt*.......Bridgeport, Conn.
H'y D. Beach, *Supt. R. S*.....Bridgeport, Conn.
Napanee, Tamworth & Quebec Ry. In progress.
Ed. W. Rathbun, *Gen. Man*....Deseronto, Ont
R. C. Carter, *Asst. Gen. Man*..Deseronto, Ont.
Narragansett Pier R. R. 4-8½ g. 8 m. 2 lo. 11 c.
G. T. Lanphear, *Supt. & Pur. Agt.* Peacedale, R. I.
Nashua & Rochester R. R. (*See Wor. & Nash.*)
Nashville, Chattanooga & St. Louis Ry.
5 g. 539 miles 87 lo. 1,979 cars.
J. W. Thomas, *G. Man. & P. Agt.* Nashville, Tenn.
M. J. C. Wrenne, *Supt*.........Nashville, Tenn.
James Cullen, *M. M. & C. B.*...Nashville, Tenn.
Nashville & Florence R. R. 5 g. 51 m.
J. Geddes, *Supt*..................Columbia, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 100 m. 7 lo. 92 c.
E. D. Frost, *Gen. Supt*...........Natchez, Miss.
Nebraska, Topeka, Iola & Memphis R. R. 4-8½ g. 16 m.
H. M. Clarke, *Gen. Man*............Girard, Kan.
C. H. Malin, *Gen. Supt*............Girard, Kan.
New Brunswick Ry. 4-8½ g. 419 m. 20 lo. 357 cars.
F. W. Cram, *Gen. Man*.........Woodstock, N. B.
Jesse Mathews, *M. M*.............Gibson, N. B.
T. N. Burpee, *M. C. B*....McAdam Junc., N. B.
J. J. Seely, *Pur. Agt*.........Woodstock, N. B.
Thos. Armstrong, *M. M*.... St. Andrew's, N. B.
G. Houlton, *M. C. B*.......St. Andrew's, N. B.
New Brunswick & Can. Ry. (*See New Brun.*)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 58 m.
C. L. Kimball, *Supt. & P. Agt.* Matteawan, N. Y.
New Castle R. R. 3-6 g. 5 m. 2 lo. 76 cars.
Geo. Pearson, *Gen. Man*.......New Castle, Pa.
New Castle & Beaver Valley R. R. (*See Penna. Co.*)
New Haven & Derby R. R. 4-8½ g. 13 m. 4 lo. 70 c.
E. S. Quintard, *Supt*.........New Haven, Conn.
J. M. Whitlock, *M. M. & C. B.* New Haven, Conn.
New Haven & No'mpton. 4-8½ g. 170 m. 28 lo. 579 c
S. B. Opdyke, Jr., *Supt*.........New Haven, Ct.
R. G. Curtis, *Pur. Agt*..........New Haven, Ct.
Henry Fox, *M. M*.................New Haven, Ct.
John Sweeny, *For. Car. Shps*....New Haven, Ct.
New Jersey & New York Ry. 4-8½ g. 37 m. 6 lo. 40 c.
J. D. Hasbrouck, *Gen. Man* Jersey City, N. J.
J. S. Drake, *Supt. & M. M*......Hillsdale, N. J.
L. B. Van Wagonen, *M. C. B*....Hillsdale, N. J.
N. J. Southern Ry. (*See Phil. & Read.; N. J. So. Div.*)
New London Northern R. R. (*See Central Ver.*)
New Orleans, B. Rouge, Vicks. & Memphis.
Jas. M. Edwards, *Gen. Man*..New Orleans, La.
John Bradley, *Supt*...........New Orleans, La.
New Orleans Pacific Ry. (*See Mo. Pac.; (6) Div.*)
New Orleans & Carrollton R. R.
4-8½ g. 15 m. 12 lo. 79 cars.
C. V. Haile, *Supt*............New Orleans, La.
John Dahmer, *M. M*............New Orleans, La.
Jas. Thorn, *M. C. B*..........New Orleans, La.
New Orleans & Mobile R. R. (*See Louis. & Nash.*)
N. O. & Northeastern R. R. (*See Cin., N. O. & Tex. Pac.*)
New Orleans & Selma R. R. 5 g. 21 m. 1 lo. 8 cars.
L. B. Schofield, Supt...............Selma, Ala.
Newport & Wickford R. R. 4-8½ g. 22 m.
Theo. Warren, *Supt*...............Newport, R. I.
Nevada Central R. R.:
C. W. Hinchcliffe, *Rec. & Supt*...Austin, Nev.
Louis Parisoe, *M. M*.....Battle Mountain, Nev.
J. B. Gilchrist, *Pur. Agt*..........Austin, Nev.
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, *Supt*..........Grass Valley, Cal.
Jas. McCormick, *M. M. & C. B.* Grass Valley, Cal.
Nevada & Oregon R. R. 3 g. 30 m. 25 cars.
D. W. Balch, *Supt*....................Reno, Nev.
N. Y. Central & Hudson River R. R.
4-8½ g. 983 m. 676 lo. 25,161 cars.
J. M. Toucey, *Gen. Supt*...... New York, N. Y.
Chas. Reed, *Pur. Agt*......... New York, N. Y.
Wm. Buchanan, *Supt. M. P. and R. Stock*, New York, N. Y.
N. Y. & Har. Div.: C. M. Bissell, *Supt.* do.
P. McQ. Gibson, *M. M*..........New York, N. Y.
Hud. Riv. Div.: C. M. Bissell, *Supt.* N. York, N. Y.
W. H. Wolfrath, *M. C. B*....New York, N. Y.
E'n Div.: Zenas C. Priest, *Supt.* Ltle Falls, N. Y.
John Ortton, *M. M*........West Albany, N. Y.
L. Packard, *M. C. B*......West Albany, N. Y.
W'n Div.: Geo. H. Burrows, *Supt*..Buffalo, N. Y.
S. L. White, *M. M*............Syracuse, N. Y.
Amos Gould, *M. M*...........E. Buffalo, N. Y.
E. Chamberlain, *M. C. B*... E. Buffalo, N. Y.
Peter Smith, *M. C. B*..... E. Rochester, N. Y.
Rd. Donaby, *M. C. B*....Niagara Falls, N. Y
N. Y. Chic. & St. L. Ry. 4-8½ g. 524 m. 108 lo. 7,245 c
Lewis Williams, *Gen. Man*.......Cleveland, O
M. M. Rogers, *Pur. Agt*.........Cleveland, O.
Jno. Mackenzie, *Supt. M. P.*....Cleveland, O
Eas'tn Div.: G. H. Kimball, *Supt*..Cleveland, O
E. A. Miller, *M. M*..............Conneaut, O
West'n Div.: C. D. Gorham, *Supt*....Chicago, Ill.
W. H. Lewis, *M. M*..............Bellevue, O
New York City & Northern. 4-8½ g. 58 m. 17 lo. 368 c
Frank S. Gannon, *Gen. Supt.* High Bridge, N. Y.
Thos. Millen, *M. M*.........High Bridge, N. Y.
New York, Lackawanna & W'n Ry. (*See Del. L. & W.*)
New York, Lake Erie & Western R. R.
S. M. Felton, Jr., *V. Pr*...... New York, N. Y.
(1) N. Y., L. E. & W. Div.: 4-8½ g. 1,073 m. 576 lo. 30,553 c.
B. Thomas, *Gen. Supt*........Jersey City, N. J.
W. G. Tuller, *Pur. Agt*........New York, N. Y.
F. M. Wilder, *Supt. M. P. & M.*..Susqueh'a, Pa.
E'n Div.: E. O. Hill, *Supt*......Jersey City, N. J.
J. H. Vreeland, *M. M*.......Jersey City, N. J.
J. N. Mileham, *M. C. B*.....Jersey City, N. J.
Del. Div.: E. Van Etten, *Supt*..Port Jervis, N. Y.
J. Van Vechten, *M. M. & C. B.* Pt. Jervis, N. Y.
Susq. Div.: R. B. Cable, *Act. Supt*..Elmira, N. Y.
V. Blackburn, *M. M*.........Susquehanna, Pa
D. B. Goodell, *M. C. B*..........Elmira, N. Y
Buf. & R. Divs.: W. J. Murphy, *Supt.*; and
Wm. Litz, *M. M*...................Buffalo, N. Y.
M. Wilder, *M. C. B*...............Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, *Supt.* do.
W'n Div.: W. B. Coffin, *Supt.*.Hornellsville, N. Y.
J. Hawthorne, *M. M*.......Hornellsville, N. Y.
N. Y. & Greenwood L. Ry. 4-8½ g. 44 m. 8 lo. 53 c.
Stephen Smith, *Supt*..........Jersey City N. J.
F. A. Stinard, *M. M*...........Pompton, N. J.
(2) N. Y., Pa & O. Div.: 4-8½ g. 565 m. 221 lo. 7,794 c.
Chas. Paine, *Gen. Supt*........Cleveland, Ohio.
J. H. Holway, *Pur. Agt*........Cleveland, Ohio.
Wm. Fuller, *Supt. M. P*.........Cleveland, O.
S. V. Smith, *Asst. Gen. M. C. B.*...Kent, Ohio.
E'n Div.: A. L. Dunbar, *Supt*.......Meadville, Pa.
J. A. Cooper, *M. M*................Meadville, Pa.
D. S. Dockstader, *M. C. Rep*...Meadville, Pa
W'n Div.: T. A. Phillips, *Supt*..........Galion, O.
Wm Hill, *M. M*..........................Galion, O.
Geo. Wilson, *For. Car Rep*.........Galion, Ohio.
Maho'g Div.: N. F. Wood, *Supt*.......Cleveland, O.
N. Wright, *M. M*...................Cleveland, O.
C. N. Thorp, *M. C. Rep*...........Cleveland, O
New York, New Haven & Hartford R. R.
4-8½ g. 203 m. 123 lo. 2,768 cars.
E. M. Reed, *V. P. & Gen. Supt.* New Haven, Ct.
R. N. Dowd, *Pur. Agt*.............New Haven, Ct.
John Henney, Jr., *Supt. M. P*...New Haven, Ct.
N. Y. & N. H. Div.: W. H. Stevenson, *Supt*...N. Y.
Shore Line and Air Line Divs.:
O. M. Shepard, *Supt*...........New Haven, Ct.
Jas. Denver, *M. C. B*..........New Haven, Ct.
Hart. Div.: C. S. Davidson, *Supt*....Hartford, Ct
O. C. Lackey, *M. M*................Hartford, Ct
Jno. Whitmore, *For. C. Dept*...Hartford, Ct.
N. Y., Ontario & Western Ry. (*See N. Y., W. Sh. & Buf.*)
N. Y., Pittsb'h & Chicago. 4-8½ g. 20 m. 2 lo. 32 c.
Geo. W. Dixon, *Supt*...........New Galilee, Pa.
H. T. Hanna, *Pur. Agt*..........Pittsburgh, Pa.
N. Y., Pennsylvania & Ohio R. R. (*See N. Y., L. E. & W.*)
New York, Philadelphia & Norfolk R. R.
4-8½ g. 10 m. 1 lo. 4 cars.
H. W. Dunne, *Supt*...........Cape Charles, Va.
New York, Providence & Boston R. R.
4-8½ g. 83 m. 29 lo. 430 cars.
J. B. Gardner, *Supt*.............Providence, R. I.
J. L. Hayden, *Pur. Agt*......Stonington, Conn.
Geo. H. Griggs *M. M. & C. B.*.Providence, R. I.
N. Y., Susqueh'na & W'n. 4-9 g. 147 m. 33 lo. 1,469 c.
F. A. Potts, *Gen. Man*......... New York, N. Y.
C. D. McKelvey, *Supt*.........Jersey City, N. J
C. T. Demarest, *Pur. Agt*.....New York, N. Y.
W. C. Ennis, *M. M. & C. B*...Wortendyke, N. J.
New York, Texas & Mexican Ry.
4-8½ g. 92 m. 6 lo. 95 cars.
Allen McCoy, *Gen. Man*...........Victoria, Tex.
J. G. Conlon, *M. M*...............Victoria, Tex
New York, West Shore & Buffalo.
4-8½ g. 850 m. 177 lo. 7,291 c.
J. D. Layng, *Gen. Man*.........New York, N. Y.
C. W. Bradley, *Gen. Supt*.....Weehawken, N. J.
P. S. Bemis, *Pur. Agt*.........New York, N. Y.
R. H. Soule, *Supt. M. P.*.......Frankfort, N. Y.
H. R. Div.: J. P. Bradfield, *Act. Supt.*, Weehawken, N. J
Thos. Oldcorn, *M. M*.....New Durham, N. J.
Buff. Div.: D. B. McCoy, *Supt*.....Newark, N. Y.
N. Falls Div.: W. J. Murphy, *Supt.* Buffalo, N. Y.
Coeymans to Newark.
Jas. M. Boon, *M. M*...........Frankfort, N. Y.
Newark to Buffalo.
Geo. W. West, *M. M*....... East Buffalo, N. Y
New York, Ontario & Western.
J. E. Childs, *Gen. Supt*........New York, N. Y.
N. Y. Woodhaven & Rockaway R. R. (*See Long Is.*)
N. Y. & Greenwood Lake Ry. (*See N. Y., L. E. & W.*)
N. Y. & Manhattan Beach Ry. (*See Long Island.*)
New York & Long Branch R. R. (*See Phil. & Read.*)
New York & New England R. R.
4-8½ g. 473 m. 145 lo. 3,959 cars.
W. H. Turner, *Gen. Supt*.......... Boston, Mass.
W. W. McKim, *Pur. Agt*...........Boston, Mass.
J. B. Henney, *Supt. M. P*........ Boston, Mass.
Geo. E. Boyden, *M. M*..........Norwood, Mass.
Elias E. Pratt, *M. C. B*.........Norwood, Mass.
East Div: E. G. Allen, *Supt*........Boston, Mass.
Nor. Div.: P. St. M. Andrews, *Supt*...Norwich, Ct.
, *M. M*.................Norwich, Ct.
Prov. Div.: L. W. Palmer, *Supt*..Providence, R. I.
Hfd. Div.: E. Holbrook, *Supt*.......Hartford, Ct.
E. M. Humstone, *M. M*...........Hartford, Ct.
West'n Div.: C. H. Platt, *Supt*.....Fishkill, N. Y.
Woons'kt Div.:
E. N. Tucker, *Supt*.......... Needham, Mass.
New York & Sea Beach R. R. 4-8½ g. 6 m. 6 lo. 41 c.
W. O. McDowell, *Gen. Man*.... New York, N. Y.
C. W. Douglass, *Gen. Supt*...Bay Ridge, N. Y.
Newark, Somerset & Straitsville R. R. (*See B. & O.*)
Newburg, Dutchess & Conn. R. R. 4-8½ g. 59 miles.
C. L. Kimball, *Gen. Supt*.....Matteawan, N. Y
W. G. Van Buskirk, *M. M. & C. B.*, Dutchess Junction, N. Y
Newfoundland Ry. 3-6 g. 45 m. 7 lo. 41 c.
C. X. Hobbs, *Gen. Man*........St. John's, N'f'd

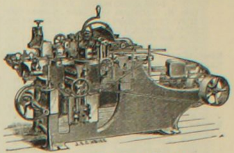
WOOD-WORKING MACHINERY

FOR

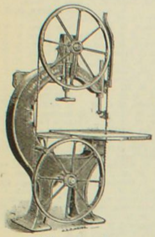
PLANING MILLS,
CAR SHOPS,
RAILWAY SHOPS,
BRIDGE BUILDERS,
Etc., Etc.



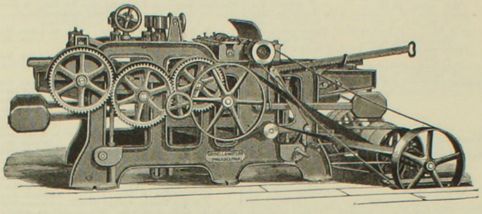
Single Spindle Upright Shaper.



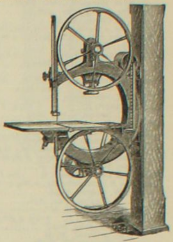
Seven-Inch Four-Sided Molder.



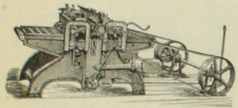
35-Inch Band Saw.



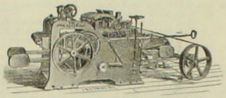
CAR SILL PLANER AND DOUBLE-SURFACER AND JOINTER.



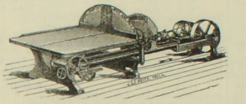
Bracket Band Saw.



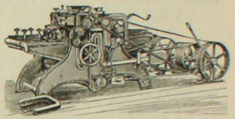
No. 2 Single Surfacer.



"The Philadelphia" Endless Bed D. S.



New Railway Cut-Off Saw.



No. 2 Single Surfacer and Matcher.

GOODELL & WATERS,

SEND FOR CATALOGUE.

Philadelphia, Penn.

THE LAUFMAN SCREW-BRAKE FOR FREIGHT OR PASSENGER CARS.

USES NO DOG OR RATCHET. Can be set from the ground as well as from top of Car ; can be made for Inside or Outside Brake ; applies and releases almost instantly ; remains as set. ☞ **JARRING WILL NOT RELEASE IT.** *Employés free from the danger usually attending the use of chain brakes.*

☞ **Entirely Avoids Flat Wheels.**

THE LAUFMAN SCREW-BRAKE COMPANY,
Box 2226. ST. PAUL, MINN.

AUDIBLE DANGER SIGNALS FOR RAILROADS.

THE

RAILWAY CAB ELECTRIC SIGNAL CO.

Equip Railroads with Block and Crossing Systems, Switch, Bridge, Culvert and Trestle Danger Signals.

Special Systems of Signals Designed for Termini and other Points. Also Furnish their Electric Automatic Gate Guard for Road and Street Crossings, Dispensing with the Services of Gatemen.

The signals are all given audibly on the Locomotive by the opening of a normally closed circuit, are thoroughly automatic in their operation, and signal danger when out of order from accident or malevolence. The signal, once given, sounds continuously until stopped by the engineer. **No Batteries are used on the Locomotive, nor on the line, nor any mechanism requiring to be wound or adjusted.** These signals give absolute safety under all conditions where carelessness and inattention to visual signals result in accident. Examination solicited and proofs of actual working given. Descriptive pamphlets sent.

General Offices, 47 Exchange Place, New York, U. S. A.

C. N. JORDAN, President. EDWARD FLASH, Vice-President. THOS. C. MILES, General Manager. ARNOLD LEO, Treasurer. E. S. BLACKWELL, Secretary. T. A. B. PUTNAM, Electrician. C. L. BRUNS, Mechanical Sup't.

Improved Wood-Working Machinery

FOR

Railroad, Car and Bridge Shops, Government Arsenals and Navy Yards,

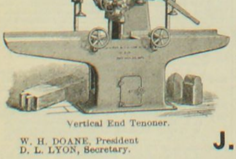
EMBRACING MACHINES FOR

SILL AND TIMBER DRESSING,
PLANING, MATCHING AND BEADING,
MOLDING AND SHAPING,
MORTISING AND BORING,
CAR GAINING,
CAR BORING, Etc., Etc.,

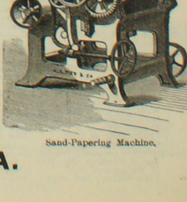
BAND AND SCROLL SAWING,
CIRCULAR AND BAND RESAWING,
SELF-FEEDING RIPPING & CROSS-CUTTING,
ROTARY CAR MORTISING AND BORING,
SAND PAPERING,
CAR TENONING, Etc., Etc.

Illustrations and Estimates furnished upon application to

J. A. FAY & CO., Cincinnati, Ohio, U. S. A.



Vertical End Tenoner.



Sand-Papering Machine.

W. H. DOANE, President
D. L. LYON, Secretary.

Norfolk Southern R. R. 4-8½ g. 74 m. 7 lo. 182 c.
M. K. King, *Gen. Man. & Pur. Agt.* Norfolk, Va.
J. S. Whitworth, *M. M. & C. B* ....Norfolk, Va.
Norfolk & Ocean View R. R. & Hotel Co.
3 g. 8 m. 2 lo. 9 cars.
W. H. Taylor, *Pres* ....Norfolk, Va.
Norfolk & Va. Beach R. R. 3 g. 18 m.
J. M. Dickey, *Gen. Man*........ ...Norfolk, Va
Norfolk & Western R. R. 5 g. 486 m. 82 lo. 1,779 c.
Jos. H. Sands, *Gen. Supt*... ...Roanoke, Va.
S B. Hauot, *Supt. M. Power*.... Roanoke, Va.
East Div.: N. M Osborne, *Supt*.....Norfolk, Va.
West Div.: Frank Huger, *Supt*..Lynchburg, Va
North-Eastern R. R. of Ga. 5 g. 72 m. 2 lo. 20 cars.
H. R. Bernard, *Supt*................Athens, Ga.
North-Eastern R. R. (S. C.) (*See Wil. & Wel.*
North Pacific Coast R. R. 3 g. 84 m. 12 lo. 320 cars.
Gen. Supt..........San Rafael, Cal.
W. F. Russell, *Pur Agt* ....San Francisco, Cal.
E. L. Reese, *M. M.* ....Saucelito, Cal.
North Shore Ry. 4 8½ g. 209 m. 21 lo. 564 c.
W. Wainwright, *Gen. Man* .....Montreal, Can.
A. Davis, *Supt. & Pur. Agt*.......Quebec, Can
Northern (N. H.), and Concord & Claremont Rys.
(*See Boston & Lowell.*)
Northern (N. J.) R. R. (*See N. Y., L. E. & W'n.*)
Northern Central Ry. (*See Penna. R. R.* (6) *Div.*)
North'n Pacific R. R. 4-8½ g. 2,646 m. 391 lo. 9,897 c.
T F. Oakes, *Gen. Man*..... .....St. Paul, Minn.
John H. Ames, *Gen. Pur. Agt*..St. Paul, Minn.
Geo. W. Cushing, *Supt. M. P., M. & R. S.* do.
J. C. Barber, *M. C. B*..... ....Brainerd, Minn.
(1) E'n Div.: J. T. Odell, *A. Gen. Man.* St. Paul, Minn.
1st Gr. Div.: M. C. Kimberly, *Supt.* Brainerd, Minn.
H. J. Small, *M. M* ....Brainerd, Minn.
M. C. B......Brainerd, Minn.
2d Gr. Div.: J. M. Graham, *Supt.* Jamestown, Dak.
C. C. Quinn, *M. M*.............. Fargo, Dak.
A. Bardsley, *M. M*.............Mandan, Dak.
F. Greene, *A. Supt*......... ..Mandan, Dak.
3d Gr. Div.: S. R. Ainslie, *Supt*.. Glendive, Mont.
S. L. Bean, *M. M* ....Glendive, Mont.
C. W. Rossiter, *M. M*........Livingston, Mont.
(2) W'n Div.: J. M. Buckley, *Asst. Gen. Man.*
New Tacoma, W. T
W. T. Small, *A. S. Mach*.......Tacoma, W. T.
4th Gr. Div.: F. W. Gilbert, *Supt.* Missoula, Mont.
F. P. Weymouth, *Supt*...... .. Sprague, W. T.
Wm. Garlock, *M. M*.........Missoula, Mont
J. Evans, *M. M*....... ....Sprague, W. T.
5th Gr. Div.: Otis Sprague, *Supt*...Tacoma, W. T.
Northern & North-W'n Rys. 4-8½ g. 378 m. 50 lo. 1,195 c.
James Webster, *Supt*..... ....Toronto, Can.
W. C. Schreber, *Pur. Agt*.......Allandale, Can.
P. Clarke *M. M*... .... .Toronto Can.
Northern & Western Ry. 4-8½ g. 50 m.
J. B. Snowball, *Man*......... ..Chatham, N. B.
Nova Scotia Ry. 4-8½ g. 79 m. 9 lo. 268 c
C. A. Scott, *Gen. Man*.. ...New Glasgow, N. S.
M. F. Punch, *M. M*........New Glasgow, N. S

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 130 m. 33 lo. 1,694 cars.
A. A. Gaddis, *Gen. Man*......Ogdensburg, N. Y
E. B. Burnham, *Pur. Agt*...Ogdensburg, N. Y.
Wm. A. Short, *M. M*......... ....Malone, N. Y.
H. S. Leach, *Master Builder*. Ogdensburg, N. Y.
Ohio Central R. R. 4-8½ g. 325 m. 46 lo. 4,760 cars.
John E. Martin, *Rec*...... . Toledo, O.
T. M. Peelar, *Supt* .... .Bucyrus, O
F. W. Stewart, *Pur. Agt* .. ..Toledo, O.
J. B. Morgan, *M. M. & C. B*... ....Bucyrus, O.
Ohio River R. R. 4-9 g. 9 lo. 350 cars.
C. L. Williams, *Asst. Supt.* Parkersburg, W. Va.
S. Litchworth, *M. M.* .....Parkersburg, W. Va.
Ohio Southern R. R.:
W. H. Van Tassel, *Supt*....... .Springfield, O.
John King, *M. M*................Springfield, O.
Ohio & Mississippi Ry. 4-9 g. 616 m. 113 lo. 2,501 cars.
W. W. Peabody, *Pres. & Gen. Man.* Cincinnati, O.
G. E Atwood, *Pur. Agt*.........Cincinnati, O.
Gen. M. M.... .... Cincinnati, O.
Cin. Div.: C. B. Cole, *Supt*..... ....Seymour, Ind.
J. P. Coulter, *Gen. M. C. B*.... ..Aurora, Ind.
E. E. Jenks, *A. Gen. For*......Seymour, Ind.
W. L. Hoffecker, *Ass't M. M.* Vincennes, Ind.
A. N. Bradley, *M. C. P*........Cochran, Ind
St. L. & Sp. Div.: C. M. Stanton, *Supt.* St. Louis, Mo.
J. W. Stokes, *M. M.* (Spring. Div.)..Pana, Ill.
Louisv. Div.: C. B. Cole, *Supt* . .Louisville, Ky
Old Colony R. R. 4-8½ g. 470 m. 124 lo. 3,327 cars.
J. R. Kendrick, *Gen. Man*........Boston, Mass.
R. W. Husted, *Pur. Agt*...........Boston, Mass.
Jas. N. Lauder, *Supt. R. S*...... Boston, Mass.
Sam. Stevens, *S. Br. & Bld'gs*....Boston, Mass.
Main Li. Div.: J. H. French, *Supt*...Boston, Mass.
F. M. Twombly, *M. M*......... ..Boston, Mass.
Cape Cod Div.: C. H. Nye, *Supt*..Hyannis, Mass.
F. M. Twombly, *M. M*.............Boston, Mass
No. Div.: S. A. Webber, *Supt*....Fitchburg, Mass
A. W. Twombly, *M. M*.... ....Taunton, Mass.
Olympia & Chehalis Val. R. R. 3 g. 15 m.
Otis Sprague, *Supt* ....Olympia, W. T.
Oregon Ry. & Navigation Co.
3 & 4-8½ g. 807 m. 72 lo. 1,611 cars.
C. H. Prescott, *V. P. & Gen. Man.* Portland, Ore.
F. T. Dodge, *Supt.* (Riv. Div.)....Portland, Ore.
H. S. Rowe, *Supt.* (Ry Div.)......Portland, Ore.
J. M. Drake, *Pur. Agt*........... Portland, Ore.
Goodall, Perkins & Co., *Supt*. (Ocean Div.)
San Francisco, Cal.
C. C. Hobart, *Gen. M. M*.. .....The Dalles, Ore
P. Carlsen, *Foreman* ....The Dalles, Ore.
Oregon & California R. R. 4-8½ g. 449 m. 43 lo. 626 c.
R. Koebler, *Man*................Portland, Ore
J. Brandt, *Gen. Supt*.............Portland, Ore.
W. T. Bodley, *Pur. Agt*..........Portland, Ore.
A. Brandt, *M. M*.. ....Portland, Ore
Ottumwa & Kirkville Ry. 4-8½ g. 13 m.
J. A. Kebler, *Supt* ....Ottumwa, Ia.
Owensboro & Nashville R. R. 5 g. 44 m. 3 lo. 70 c.
W. M. Newbold, *Supt*..........Owensboro, Ky.
J. T. Edwards, *M. M. & C. B*. Owensboro, Ky.
Oxford & Henderson R. R. 4-8½ g. 13 m. 2 lo. 11 c.
James A. White, *Gen. Supt*...Henderson, N. C.
James E. Lawrence, *M. M* ...Henderson, N. C.

P

Pacific Coast Ry. 3 g. 64 m.
J. M. Fillmore, *Manager*. San Luis Obispo, Cal.
John Walch, *M. M. & C. B.* do.
Painesville & Youngstown Ry. 3 g. 65 m. 7 lo. 319 c.
R. K. Paige, *Rec. & Man*........Painesville, O.
J. A. Newcome, *Supt. R. S*.... ..Painesville, O.
Panama R. R. 5 g. 48 m. 14 lo. 2,200 cars.
G. A. Burt, *Gen. Supt*..... Aspinwall, U. S. Col.
E. Z. Penfield, *Pur. Agt*.......New York, N. Y.
Jos. Beaumont, *M. M*... .Aspinwall, U. S. Col
Passumpsic R. R. 4-8½ g. 147 m. 28 lo. 1,101 cars.
E. Raymond, *Pres. & Pur. Agt*. Boston, Mass.
H. E. Folsom, *Supt*...........Lyndonville, Vt.
L. L. Brigham, *M. M*........ . Lyndonville, Vt.
L. F. Woodard, *M. C. B* ......Lyndonville, Vt.
Paw Paw and Toledo & South Haven R. Rds.
3 g. 20 m. 3 lo. 16 cars.
John Ihling, *Supt*...... ....Lawton, Mich.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
B. B. Newton, *Supt. & Pur. Agt*...Oxford, Pa.
E. H. Williams, *M. C. B*..............York, Pa.
W. P. Kirk, *M. M*....................Oxford, Pa.
Pemigewasset Valley R. R. 4-8½ g. 21 m. 2 lo. 127c.
J. Thomas Vose, *Pres*........ .. Boston, Mass.
Pennsylvania Co.'s (5) Roads
4-9 g. 3,222 m. 920 lo. 32,809 cars.
Gen. Divs. (1), (2), (3), (4) and (5).
Wm. A. Baldwin, *Gen. Man*... Pittsburgh, Pa.
John Thomas, *Gen. Supt*.... Pittsburgh, Pa.
Wm. Mullins, *Gen. Pur. Agt*....Pittsburgh, Pa.
Joseph Wood, *Supt. M. P*.... .Fort Wayne, Ind.
(1) Pittsburgh, Ft. Wayne & Chicago Ry.
4-9 g. 468 m. 288 lo. 8,023 cars.
E'n Div.: A. B. Starr, *Supt*.......Allegheny, Pa.
Geo. J. Parkin, *M. M*..... ....Allegheny, Pa.
D. M. Peppard, *M. M*......... . Crestline, O.
W'n Div.: C. D. Law, *Supt*.....Ft. Wayne, Ind.
F. D. Casanave, *M. M*........Ft. Wayne, Ind.
A. H. Somers, *Gen. For. Shops*...Chicago, Ill.
(2) Ashtabula & Pittsburgh, and
(3) Erie & Pittsburg R. Rds. 221 m. 29 lo. 1,362 c.
John M. Kimball, *Supt*..Lawrence Junc., Pa.
J. A. Wood, *Gen. For. Shops*........Erie, Pa.
(4) Cleveland & Pittsb'g R. R. 225 m. 97 lo. 3,534 c.
R. F. Smith, *Asst. Man*.... .....Cleveland, O.
Philip Bruner, *Supt*.............Wellsville, O.
W. F. Beardsley, *Mast. of Mach*. Wellsville, O.
5) No-W'n Ohio Ry.: J. S. Morris, *Supt*...Toledo, O.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 3,158 m. 1,459 loco. 66,816 cars.
Chas. E. Pugh, *Gen Man*......Philadelphia, Pa.
Enoch Lewis, *Pur. Agt*.......Philadelphia, Pa.
S. M. Provost, *Supt. Trans*...Philadelphia, Pa.
Theo. N. Ely, *Gen. S. M. P*.........Altoona, Pa.
Pennsylvania R. R. Divs.
4-9 g. 1,213 m. 705 lo. 46,819 cars.
Robt. E. Pettit, *Gen Supt*. ... ..Altoona, Pa
Frank L. Sheppard, *Supt. M. P*..Altoona, Pa.
G. W. Strattan, *M. M*.. ....Altoona, Pa
Jno. P. Levan, *Gen. Fore*.... ....Altoona, Pa
Phila. Div.: Tho. Gucker, *Supt.* Philadelphia, Pa.
H. D. Garrett, *M. M*....W. Philadelphia, Pa.
I. W. Van Houten, *Gen. For*....W. Phila., Pa.
Schuylkill Div.:
Jas. Reed, *Supt*...... ....Reading, Pa.
Mid. Div.: O. E. McClellan, *Supt.* Harrisburg, Pa.
E. L. Caum, *M. M*...........Harrisburg, Pa.
Samuel W. Myers, *Gen. For.* Harrisburg, Pa.
Altoona Div.: J. B. Hutchinson, *Supt.* Altoona, Pa.
Pitts. Div.: Robert Pitcairn, *Supt*..Pittsburgh, Pa.
D. O. Shaver, *M. M*...........Pittsburgh, Pa.
J. G. Stewart, *Gen. For*.......Pittsburgh, Pa.
W. Pa. Div.: A. P. Kirtland, *Supt.* Blairsville, Pa.
Wm. B. Norris, *M. M*.........Blairsville, Pa.
M. H. Fails, *Gen. For*..........Blairsville, Pa
Fred. Div.: Wilson Brown, *Supt*........York, Pa
Tyrone Div.: S. S. Blair, *Supt*........Tyrone, Pa.
Lew. Div.: Wm. M. Phillips, *Supt.* Lewistown, Pa.
Bed. Div.: R. L. Holliday, *Supt*......Bedford, Pa.
Monong. Div.: David M. Watt, *Supt.* Pittsburgh, Pa.
Wm. Lininger, *M. M* ....Ormsby, Pa.
(2) United R. Rs. of N. J. Divs. 471 m. 330 lo. 4,041 c.
F. Wolcott Jackson, *Gen. St*..Jersey City, N. J.
H. S. Hayward, *Supt. M. P*...Jersey City, N. J.
David H. Baker, *Gen. For*...Jersey City, N. J.
N. Y. Div.: Jos. A. Crawford, *Supt.* Jersey City, N. J.
L. A. Bosdevex, *M. M.* ..Jersey City, N. J.
E. F. Bosdevex, *Gen. For*..Jersey City, N. J.
Belv. Div.: J. A. Anderson, *Supt.* Lambertv., N. J.
R. McDowell, *M. M*.......Lambertville, N. J.
Amboy Div.: W. N. Bannard, *Supt.* Camden, N. J.
Thos. Kerr, *M. M*....... ....So. Amboy, N. J.
P. S. Bogart, *Gen. For*......So. Amboy, N. J.
(2½) Camden & At. Rd.: 75 m. 18 l. 261 c.
A. G. Dayton, *Supt*........... Camden, N. J.
Rufus Hill, *M. M*.. ....Camden, N. J.
Samuel Wills, *M. C. B*...... ..Camden, N. J.
(3) West Jersey R. R. 4-9 g, 188 m. 27 lo. 294 cars.
A. G. Dayton, *Gen. Supt*.........Camden, N. J
W McAlister, *M. M*.... ....Camden, N. J.
C. C. Williams, *Gen. For*........Camden, N. J.
(4) Phila., Wilm. & Balt. R. R. 409 m. 128 lo. 1,882 c.
H. F. Kenney, *Gen. Supt*. ....Philadelphia, Pa.
J. M. Wallis, *S. M. P*. ....Philadelphia, Pa.
H. D. Gordon, *M. M*.........Wilmington, Del.
W. H. Lungren, *M. C. B*..... ..Wilmington, Del.
Cen. Div.: L. K. Lodge, *Supt*......... Media, Pa.
Del. Div.: I. N. Mills, *Supt*..........Clayton, Del.
Mo. Div.: H. H. Carter, *Supt*..Wilmington, Del.
5) Phila. & Erie R. R. Divs.: 437 m. 110 lo. 3,089 c.
R. Neilson, *Gen. Supt*.... ...Williamsport, Pa.
Edw. D. Nelson, *Supt. Mo. Po.* Williamsport, Pa.
E'n. Div.: E. B. Westfall, *Supt.* Williamsport, Pa.
Sun. H. & W. Div: A. Walter, *Supt.*; and
H. K. Stout, *M. M*.... ... .Sunbury, Pa.
Mid. Div.: Tho. A. Roberts, *Supt*.....Renovo, Pa.
Wm. L. Holman, *M. M*..........Renovo, Pa.
West'n Div.: J. W. Reynolds, *Supt*.....Erie, Pa.
J. Gaskill, *M. M*..... ....Erie, Pa.
6) Northern Central Ry. 4-9 g. 346 m. 152 lo. 6,610 c.
Robert Neilson, *Gen. Supt*...Williamsport, Pa.
Edw. D. Nelson, *Supt. M. P*..Williamsport, Pa.
A. W. Sumner, *Pur. Agt*... ....Baltimore, Md.
J. M. Coale, *M. M*...............Baltimore, Md.
G. W. Demarest, *Gen. For*......Baltimore, Md.
Susq. Div.: E. B. Westfall, *Supt.* Williamsport, Pa.
Sham. Div.: A. Walter, *Supt*..... ..Sunbury, Pa.
Elm. & Can. Divs.: S. Meade, *Supt*..Elmira, N. Y.
Jas. Strode, *M. M*..... ....Elmira, N. Y.
J. C. Dyott, *Gen. For* ....Elmira, N. Y.
Sodus Bay Div.: S. Mead, *Supt.* Sodus Point, N. Y.
Baltimore Div.: H. W. Kapp, *Supt.* Baltimore, Md.
(7) Balt. & Pot. & Alex. & Fred. 125 m. 30 lo. 360 c.
H. F. Kenny, *Gen. Supt*.......Philadelphia, Pa.
A. W. Sumner, *Pur. Agt*........Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po*....Philadelphia, Pa.
H. D. Gordon, *M. M*....... . Wilmington, Del.
J. Lescallett, *For. Mach. Shop*. Washington, D. C.
R. F. Downs, *For. Car Shop*.. Washington, D. C.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 3,271 c.
J. B. Smith, *Gen. Supt*. ..... .Dunmore, Pa
And. Crane, *M. M*. ....Dunmore, Pa.
Geo. W. Simpson, *M. C. B*........Dunmore, Pa.
Pennsylvania, Slatington & New England R. R.
In progress. 4-8½ g. 18 m. 1 lo. 20 cars.
C. H. Stanton, *Supt*............New York, N. Y.
Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, *Gen. Supt*..........Ridgeway, Pa.
Pensacola & Atlantic R. R. 5 g. 161 m. 9 lo. 67 cars.
E. O. Saltmarsh, *Gen. Supt*.....Pensacola, Fla.
W. D. Robb, *M. M*............ .Pensacola, Fla.
Pensacola & Perdido R. R. 5 g. 10 m. 5 lo. 92 cars.
B. F. Simmons, *Pr. & Supt*.... Pensacola, Fla.
H. W. Simmons, *Pur. Agt*......Pensacola, Fla.
J. C. Schutte, *M. M*.............Pensacola, Fla.
People's Ry. 4-8½ g. 15 m. 2 lo. 14 cars.
W. D. Pollard, *Supt*..............Pottsville, Pa.
Peoria, Decatur & Evansville Ry.
4-8½ g. 254 m. 30 lo. 1,660 cars.
G. L. Bradbury, *Gen. Man*.... .... Peoria, Ill.
P. Reilly, *M. M*...................Mattoon, Ill.
Peoria & Farmington R. R. (*See Cen. Ia.*)
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 106 c.
Thos. B. Burnett, *Gen. Supt. & P. A.* Peoria, Ill.
O. W. Bell, *Supt* ....Peoria, Ill.
R. F. Hurd, *M. M. & C. B*.. ....Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, *Supt*......Perkiomen Junction, Pa.
H. Boyd, *Pur. Agt*..............Norristown, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 133 cars.
R. M. Sully, *Supt*..............Petersburg, Va.
Geo. F. Jones, *Pur. Agt*...... ...Petersburg, Va.
J. R. Woodard, *M. M*..... .....Petersburg, Va.
Phila., Wilmington & Balt. R. R. (*See Penna. R. R.*)
Peterborough & Hillsborough. (*See Northern, N. H.*)
Philadelphia, Newtown & N. Y. R. R. 4-8½ g. 23 m.
W. M. Geary, *Supt*............Philadelphia, Pa.
Phila. & Atlantic City R. R. 4-8½ g. 54 m.
John E. Wootten, *Gen. Man*. Philadelphia, Pa.
W. Bertolet, *Supt*......... ...Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*.......Philadelphia, Pa.
Philadelphia & Erie R. R. (*See Penna. R. R.*; (5) *Div.*)
Philadelphia & Reading R. R.
4-8½ g. 1,588 m. 940 lo. 57,477 cars.
John E. Wootten, *Gen. Man*..Philadelphia, Pa.
W. S. Wilson, *Pur. Agt*......Philadelphia, Pa.
Geo. Eltz, *Supt. Trans*.. .... Reading, Pa.
L. B. Paxson, *Eng. of Mach*...... Reading, Pa.
No. Penn. & Bound Brook Div.:
I. A. Sweigard, *Supt*........Philadelphia, Pa.
Mahanoy & Susquehanna Div.:
J. H. Olhausen, *Supt*...........Palo Alto, Pa.
D. C. Reinhart, *Asst. Supt*. ...Catawissa, Pa.
A. A. Hesser, *Asst. Supt* Mahanoy Plane, Pa.
Schuylkill & Susquehanna Br.:
H. W. Tracy, *Supt*.... . ....Pine Grove, Pa.
Reading & Columbia R. R.:
A. M. Wilson, *Supt* ....Columbia, Pa.
N. J. Central and N. J. Southern Divs.:
W. W. Stearns, *Supt*.... .. . Elizabeth, N. J.
Lehigh & Susquehanna Div.:
G. W. Twining, *Supt*. .. Mauch Chunk, Pa.
Pittsburgh, Bradford & Buffalo Ry. (*See Pitts. & West.*)
Pittsburgh, Chartiers & Youghiogheny R. R.
4-8¾ g. 19 m.
Geo. S. Griscom, *Gen. Man*.....Pittsburgh, Pa.
Pittsburgh, Cincinnati & St. Louis Ry. (5 Gen. Divs.)
4-9 g. 916 m. 239 lo. 7,133 cars.
James McCrea, *Manager*........Columbus, O.
Wm. Mullins, *Pur. Agt*.... ...Pittsburgh, Pa.
Edward B. Wall, *Supt M. P*......Columbus, O
(1) P., C. & St. L. Div.: E. B. Taylor, *Supt.* Pittsburgh, Pa.
C. B. Street, *M. M*.. ....Dennison, O.
J. M. Copeland, *G. F. Car Shops*. Steubenville, O.
2) C. & M. V. Div.: W. F. Black *Supt*..Zanesville, O.
Leroy Kells, *M. M*.. . ...Lancaster, O.
Wm. Meikle, *Gen. For*......... Lancaster, O.
Daniel Jewell, *Gen. F. Car Shops*. Lancaster, O.
(3) Li. Mi. Div.: Ralph Peters, *Supt*....Cincinnati, O.
Leroy Kells, *M. M*..............Cincinnati, O.
Jos. Underwood, *G. F. Car Shops*. Cincinnati, O.
(4) J. M. & I. R. R.: E. W. McKenna, *Supt.* Louisville, Ky.
Wm. Swanston, *M. M.* ...Jeffersonville, Ind.
Edw. Austin, *G. F. C. Shops*. Jeffersonville, Ind.
(5) Indianapolis & Vincennes R. R.
J. J. Turner, *Supt*.. ....Indianapolis, Ind.
Pittsburgh, Cleveland & Toledo R. R.
4-8¾ g. 78 m. 18 lo. 525 cars.
C. H. Andrews, *Pres*............Youngstown, O.
W. F. Hofecker, *M. M*.. ...Youngstown, O.
Pittsburgh, Ft. Wayne & Chicago Ry. (*See Penna. Co.*)
Pittsburgh Southern Ry. (*See Balt. & O.*
Pitts. & Castle Shannon R. R. 3-4 g. 9 m. 5 lo. 428 c.
Gen. Supt.... Pittsburgh, Pa.
Holmes Ward, *M. M*.......Castle Shannon, Pa.
Wm. E. Long, *M. C. B* .... Pittsburgh, Pa.
Pitts. & Lake Erie R. R. 4-8¾ g. 70 m. 30 lo. 1,528 c.
W. C. Quincy, *Gen. Man*........Pittsburgh, Pa.
D. H. Hostetter *Pur. Agt*.... . Pittsburgh, Pa.
R. W. Jones, *Mast. Trans*......Pittsburgh, Pa.
S. W. Haines, *M. M*....... ....Pittsburgh, Pa.
Pittsburgh, McKeesport & Youghiogheny.
4-8¾ g. 57 m. 19 lo. 278 cars.
W. C. Quincy, *Gen. Man*...... Pittsburgh, Pa.
R. W. Jones, *M. of Trans*......Pittsburgh, Pa.
S. W. Haines, *M. M* ....Pittsburgh, Pa.
Pitts. & Western R. R. 3 & 4-8½ g. 274 m. 50 lo. 1,407 c.
Pitts., Bradford & Buff. Ry. 3 g. 93 m. 8 lo. 163 c.
Tho. M. King, *Gen. Man*.........Allegheny Pa.
J. T. Johnson, *Supt*.... ....Allegheny, Pa.
J. Morton Hall, *Pur. Agt*..... ..Allegheny, Pa.
W. M. Flahavhan, *M. M*........Allegheny, Pa
Pontiac, Oxford & Pt. Austin R. R. 100 m.
Geo. W. Debevoise, *Pr. & Gen. Man.* N. York, N. Y.
Jas. Houston, *Gen. Supt*....... ..Pontiac, Mich.
Port Huron & No.-Western Ry. 3 g. 218 m. 14 lo. 288 c.
H. McMorran, *G. Man. & P. A.* Port Huron, Mich.
I. R. Wadsworth, *Supt*.. ...Port Huron, Mich.
Chas. Diefenbach, *M. M*.....Port Huron, Mich.
Benj. Hillier, *M. C. B*........Port Huron, Mich.
Port Jervis & Monticello R. R. 4-8½ g. 24 m. 3 lo. 13 c.
M. V. Heller, *Gen. Man*......Port Jervis, N. Y.
Port Royal & Augusta. 5 g. 180 m. 16 lo. 310c.
and Augusta & Knoxville Rys.
J. N. Bass, *Supt*..... ....Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B.* Augusta, Ga.
Portland & Ogdensburg. 4-8½ g. 110 m. 11 lo. 311 c.
J. Hamilton, *Gen. Supt. & P. A*..Portland, Me.
M. M...... ....Portland, Me.
W. G. Brewer, *M. C. B*.... ....Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 8 lo. 226 c.
J. W. Peters, *Supt. & Pur Agt*..Portland, Me.
E. H. C. Tompson, *For. of Mach*..Portland, Me.
David Dow, *For. of Car Repairs*. Portland, Me
Potomac, Fred.'g & Pied. R. R 3 g. 38 m. 2 lo. 38 c.
W. H. Richards, *Gen. Man*. Fredericksburg, Va.
W. J. Sweigard, *M. M* ....Fredericksburg, Va.
Pough., Hart. & Bos. R. R. 4-8½ g. 45 m. 4 lo. 65 c.
J. A. Perkins, *Supt*........Poughkeepsie, N. Y.
John L. Donaldson, *M. M.* Poughkeepsie, N. Y.
Pratt Coal & Iron Company's R. R. 5 g. 20 m. 4 lo. 184 c.
W. L. Gude, *Gen. Man*........Pratt Mines, Ala.
Prescott & Thirty-Fifth Parallel R. R.
4-8½ g. 77 miles in progress.
Samuel A. Henszey, *Gen. Man*..Prescott, Ariz.
Prince Edward Island Ry. 3-6 g. 220 m. 21 lo. 350 c.
Jas. Coleman, *Supt. & Pur. Agt.*;
Jos. Unsworth, *M. Supt. & Storekeeper*; and
D. M. Fraser, *M. C. B*.. .Charlottetown, P. E. I.
Profile & Franconia Notch R. R. 3 g. 15 m. 3 lo. 18 c.
Emmons Raymond, *Pur. Agt*.... Boston, Mass.
C. H. Greenleaf, *Supt*......Profile House, N. H.
Prospect Park & Coney Island R. R.
4-8½ g. 15 m. 8 lo. 123 cars.
And. R. Culver, *Pres*...... ....Brooklyn, N. Y.
R. Schermerhorn, *Supt* ....Brooklyn, N. Y.
Martin Painter, *M. M*...........Brooklyn, N. Y.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 6 lo. 79 c.
Waterman Stone, *Supt*.... ..Providence, R. I.
Rufus Smith, *M. M. & C. B*...... ..Bristol, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 4 lo. 92 c.
Wm. Tinkham, *Gen. Man*.....Providence, R. I.
G. T. Richardson, *M. M*........Providence, R. I.
Prov. & Worcester. 4-8½ g. 50 m. 37 lo. 1,253 c.
W. E. Chamberlain, *Supt* .....Providence, R. I.
A. Griggs, *Supt. L. & C. D*....Providence, R. I.
Pullman's Palace Car Co. 1,100 passenger cars.
Geo. M. Pullman, *Pres*...... .....Chicago, Ill.
H. Porter, *V. Pres*...... ....New York, N. Y.
Geo. F. Brown, *Gen. Man*...... ...Chicago, Ill.
Wm. A. Angell, *Pur. Agt*.... .....Chicago, Ill.
S. W. Bretzfield, *Asst. Pur. Agt*. New York, N. Y.
A. Rapp, *Man.* (Chicago Works)...Chicago, Ill.
H. L. Spaulding, *Man.* (Det. Shops). Detroit, Mich.
E. A. Benson, *Supt. Shops*... ... St. Louis, Mo.

Q

Quebec Central Ry. 4-8½ g. 156 m. 10 lo. 267 cars.
J. R. Woodward, *Gen. Man*..Sherbrooke, P. Q.
A. Steele, *Supt*............... Sherbrooke, Que.
R. D. Morkill, Jr., *Pur. Agt*..Sherbrooke, P. Q.
Jas. Seiveright, *M. M* ....Sherbrooke, P. Q.
Quebec, Montreal, Ottawa & Occidental Ry.
4-8½ g. 354 m. 36 lo. 993 cars.
L. A. Senecal, *Gen. Supt*........Quebec, Can.
Quebec & Lake St. John Ry. 4-8½ g. 36 m. 3 lo. 55 c.
J. G. Scott, *Manager*..............Quebec, Can.
Frank Fournier, *Supt*... ...St. Raymond, P. Q.
John T. Eames, *M. M*......St. Raymond, P. Q.

R

Raleigh & Augusta Air-Line; Carolina Central Raleigh & Gaston R. Rs. 4-8½ g. 446 m. 52 lo. 1,052 c
John C. Winder, *Gen. Man. & P. A.* Raleigh, N. C.
Raleigh Rds. 4-8½ g. 200 m. 27 lo. 638 cars.
B. R. Harding, *Supt. of Mach*. Raleigh, N. C.
Carolina Cen. R. R. 4-8½ g. 242 m. 26 lo. 431 c.
L. C. Jones, *Supt*.... .....Wilmington, N. C.
James Maglenn, *M. of Mach*. Laurinburg, N. C.
S. R. Ethridge, *M. C. B* ...Laurinburg, N. C.
Rhinebeck & Connecticut. (*See Hart. & Ct. Wn.*)
Richmond, Fredericksburg & Potomac R. R.
4-9 g. 81 m. 15 lo. 149 cars.
E. T. D. Myers, *Gen. Supt* .. Richmond, Va.
T. L. Courtney, *Asst. Supt* ..Richmond, Va.
H. Kuhn, *M. M*.......... ...Richmond, Va.
W. H. Trainham, *M. C. B*. ...Richmond, Va.
Rich., York River & Ches. R. R. (*See Rich. & Dan.*)
Richmond & Alleghany R. R. 4-9 g. 261 m. 19 lo. 837c.
Decatur Axtell, *Rec. & Gen. Man*. Richmond, Va.
M. Sweeney, *Pur. Agt*.. ....Richmond, Va
Geo. D. Harris, *M. M. & C. B*...Richmond, Va.
Richmond & Danville R. R. Co.'s Roads.
1,736 miles 218 loco. 3,833 cars.
A. L. Rives, *Gen. Man* ....Richmond, Va.
Peyton Randolph, *As. G. Man*..Richmond, Va.
J. P. Minetree, *Pur. Agt*....... Richmond, Va.
R. D. Wade, *Supt. Mo. Po*... ...Richmond, Va.
(1) Rich. & Dan. R. R. 5 g. 847 m. 131 lo. 2,687 cars.
Rich. & Dan. Div.: 5 g. 320 m. 80 lo. 1,797 c
Wm. H. Green, *Supt*...... ....Richmond, Va.
M. M... ....Richmond, Va.
J. B. Vaughan, *For. Car Sh*...Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
A. B. Andrews, *Supt*.... ......Raleigh, N. C.
W. H. Turrentine, *M. M.* Comp'y's Shops, N. C.
J. C. Holt, *For. Car Sh.* Comp'y's Shop N. C.
Atlanta & Char. Air Line. 5 g. 288 m. 31 lo. 415 c.
Narrow-Gauge Branches. 3 g. 80 m. 5 lo. 41 c.
Edmund Berkley, *Supt*..... ....Atlanta, Ga.
T. W. Gentry, *M. M*. .. ..Atlanta, Ga.
Z. T. Smith, *For. Car Sh*........ Atlanta, Ga.
(2 Charlotte, Col. & Aug. R. R. 5 g. 239 m. 22 lo. 287 c.
G. R. Talcott, *Supt*...........Columbia, S. C.
J. H. Green, *M. M.* (2 roads)...Columbia, S. C.
(3) Columbia & Greenville R. R. 5 g. 297 m. 22 l. 224 c.
G. S. Talcott, *Supt*...........Columbia, S. C.
J. O. Meredith, *For. E. & C. Rep*.. do.
(4) Virginia Midland Ry. 4-8½ g. 353 m. 41 lo. 631 c.
Supt. Alexandria, Va.
H. M. Smith, *M. of M*.......Alexandria, Va.
J. T Nalls, *M. C. B*. .... Alexandria, Va.
Richmond & Petersburg R. R. 4-8½ g. 25 m. 8 lo. 132 c.
J. R. Kenly, *Supt*..... ....Richmond, Va.
John O'Brien, *M. M*.............Richmond, Va.
Rio Grande R. R. 3-6 g. 22 m. 3 lo. 40 cars.
M. J. Gomila, *Rec. & Gen. Man*. Brownsville, Tex
G. W. Rendall, *M. M*......... Brownsville, Tex.
M. Markwood, *M. C. B*... ....Brownsville, Tex.
Rio Grande & Pecos Ry. 4-8½ g. 27 m. In progress.
W. W. Hungerford, *Man*..........Laredo, Tex.
Rochester & Lake Ontario Ry. 4-8½ g. 6 m. 2 lo. 10 c.
N. B. Ellison, *Man* ....Rochester, N. Y.
Rochester & Pittsb'g. R. R. 4-8½ g. 260 m. 60 lo. 3,296 c.
Geo. E. Merchant, *Gen. Man*...Rochester N. Y.
J. T. Gardiner, *Gen. Supt*.......Buffalo, N. Y.
C. W. Mills, *Supt. M. P*. ... . Rochester, N. Y.
Rock Island & Mercer County R. R., and
Rock I'd & Peoria Ry. 4-8½ g. 113 m. 13 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt*.....Chicago, Ill
R. I. & P. Ry.:
H. B. Sudlow, *Supt. & P. A*....Rock Island, Ill.
Joseph Elder, *M. M*...............Peoria, Ill.
R. I & M. C. Rd.: H. B. Sudlow, *Supt.* R'k Island, Ill.
J. H. Parks, *M. M*........... .Rock Island, Ill.
Rogersville & Jefferson R. R. 5 g. 16 m. 1 lo. 6 cars.
C. M. Leuty, *Supt*....... Rogersville, Tenn.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 17 cars
Eben Hillyer, *Pres. & Supt*........ Rome, Ga.
O. W. Harbin, *M. M*.... .... Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4-8½ g. 418 m. 61 lo. 1,831 cars.
H. M. Britton, *Gen. Man. & P. A.* Oswego, N. Y.
Geo. H. Haselton, *S. M. P. & M*..Oswego, N. Y.
E'n Div.: J. D. Remington, *A. Supt.* Watertown, N. Y.
W'n Div.: W. H. Chauncey, *A. Supt.* Oswego, N. Y
Roodhouse & Scottsville Ry. In progress.
Geo. P. Merrill, *Gen. Man*.........Chicago, Ill.
Rumford Falls & Buckfield R. R. 4-8½ g. 29 m. 2 l. 62 c.
L. L. Lincoln, *Supt. & Pur. Agt*...Canton, Me.

S

Sabine & East Texas Ry. (*See Cen. Pac.*)
Sacramento & Placerville R. R. (*See Cen. Pac.*)
Saginaw Bay & Northw'n R. R. 4-8½ g. 31 m. 6 lo. 136 c.
J. Jackson, *Gen. Man*.... ...Pinconning, Mich.
F. T. Lillote, *Act. Pur. Agt*...Pinconning, Mich.
Edward Keeler, *M. M*........Pinconning, Mich.
Saginaw, Tuscola & Huron R. R.
3 g. 50 m. 5 lo. 85 cars.
M. B. Wilkinson, *Gen. Supt*..E. Saginaw, Mich.
Saginaw Valley & St. Louis R. R. 4-8½ g. 39 m. 4 l. 64 c
T. M. Fish, *Gen. Supt*...... ....Ionia, Mich.
N. W. Merrill, *Div. Supt*........Saginaw, Mich.
Allan Bourn, *Pur. Agt*.. ....Detroit, Mich.
Geo. C. Watrous, *M. M*.............Ionia, Mich
Salt Lake & Western R. R. (*See Un. Pac.*; (6) *Div.*)
San Francisco & No. Pac. 4-8½ g. 139 m. 11 lo. 245 c.
Arthur Hughes, *Gen. Man*..San Francisco, Cal.
H. C. Whiting, *Supt*....... ...San Rafael, Cal.
Ed. Reynolds, *Gen. M. M*.........Donahue, Cal.
Ed. Reynolds, *M. C. B*.......... Donahue, Cal.
Sanborn, Cooperstown & Turtle M. R. R. In progress.
C. A. Roberts, *Gen. Man*. .. .. Sanborn, Dak.
Sandy River R. R. 2 g. 18 m. 3 lo. 36 cars.
N. B. Beal, *Pres. & Supt* ....Phillips, Me.
M. Saunders, *M. M. & C. B*...... ..Phillips, Me.
Sandusky, Mansfield & Newark R. R. (*See B. & O.*)
Sanford & Indian River R. R. (*See So. Flor.*)
San Luis Obispo & Santa Maria R. R.
3 g. 20 m. 2 lo. 30 cars.
Charles Goodall, *Man*......San Francisco, Cal.
San Pete Valley R. R. 3 g. 33 m. 2 lo. 57 cars.
S. Bamberger, *Man*..... Salt Lake City, U. T.
J. E. Bamberger, *Pur. Agt*.... Salt Lake, U. T.
B. Bates, *M. M*................. Morvin, U. T.
Saratoga, Mt. McGregor & Lake George R. R.
3 g. 11 m. 3 lo. 12 cars.
John McGee, *Supt*. ....Saratoga Springs, N. Y.
Savannah, Florida & W'n Ry. 5 g. 519 m. 62 lo. 1,063 c.
H. S. Haines, *Gen. Man*........Savannah, Ga.
R. G. Fleming, *Supt*.... ....Savannah, Ga.
A. A. Aveilhé, *Pur. Agt*..........Savannah, Ga
G. M. D. Riley, *M. of Mach*......Savannah, Ga
E. Geffcken, *For. Car Dept*.....Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central* (*Ga.*)
Schuylkill & Lehigh R. R. (*See Phil & Read.*)
Scoharie Valley R. R. (*See Middleburg & Sch.*)
Scioto Valley R. R. 4-8¾ g. 132 m. 19 lo. 548 cars
Geo. Skinner, *Supt. & P. Agt*.....Columbus, O.
R. Bromley, *M. M*....... .....Portsmouth, O
Seaboard & Roanoke R. R. 4-8½ g. 80 m. 21 lo. 384 c.
L. T. Myers, *Supt*............Portsmouth, Va.
J. A. Walton, *Pur. Agt*........Portsmouth, Va.
M. M. Pendleton, *S. M. P. & M.* Portsmouth, Va.
Sedalia, Warsaw & Southern Ry. (*See Mo. Pac.*)
Sharpsville R. R. 4-8½ g. 23 m. 3 lo. 13 cars.
Thos. M. King, *V. P. & Gen. Man.* Pittsburgh, Pa.
W. C. Agnew, *Asst. Gen. Man*..Youngstown, O.
Shelby Iron Co. R. R. { 5-9 g. 7 m. 2 lo. / 3-6 g. 12 m. 3 lo. } 50 c.
J. A. McArthur, *G. Man*..Shelby Ir. Wks, Ala.
R. H. Stoughton, *Supt*..Shelby Iron Wks., Ala.
J. H. Burghardt, *M. M*..Shelby Iron Wks, Ala.
Shell Beach R. R. 5 g. 22 m.
M. R Spelman, *Supt* ....New Orleans, La.
Shenandoah Valley R. R. 4-9 g. 249 m. 32 lo. 849 c.
D. W. Flickwir, *Gen. Supt* ....Roanoke, Va.
W. C. De Armond, *Pur. Agt*. ..Philadelphia, Pa.
Supt. of M. P...Roanoke, Va.
W. A. Morgan, *M. C. B*.........Lynchburg, Va.
J. T. Robinett, *M. M*.... .. .. Petersburg, Va.
Shenango & Allegheny R. R 4-8½ g. 74 m. 8 lo. 248 c.
J. T. Blair, *G. Man. & Pur. Agt*. Greenville, Pa.
Edw. Richardson, *M. M. & C. B.* Greenville, Pa.
Shepaug R. R. 4-8½ g. 38 m. 3 lo. 28 cars.
Edwin McNeill, *Supt*.............Litchfield, Ct.
A. J. Broughet, *M. M*.......... Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt*....Ripley, Miss
W. H. Phelps, *M. M*..................Ripley, Miss
Silver City, Deming & Pacific R. R. 3 g. 47 m. 3 l. 141 c.
John W. Smith, *Gen. Supt*....Silver City, N. M.
Silver Lake Ry 4-8½ g. 6 m. 1 lo. 4 cars
C. W. S. Nobles, *Supt*.......... ..Perry, N. Y
Sinaloa & Durango R. R. 4-8½ g. 39 m. 2 lo. 40 cars.
Geo. S. Skilton, *Gen. S.* Culiacan, Sinaloa, Mex.
John E. Bell, *M. M*...............Culiacan, Mex.
Skaneateles R. R. 4-8½ g. 5 m. 2 lo. 5 cars.
J. McNamara, *Supt*..........Skaneateles, N. Y.
Sioux City & Pacific R. R. 4-8½ g. 427 m. 31 lo. 893 c.
W. P. Linsley, *Gen. Man*.... Missouri Valley, Ia.
C. M. Lawler, *Gen. Supt*....Missouri Valley, Ia.
R. W. Hamer, *Pur. Agt*.. ....Chicago, Ill.
W. G. Brownson, *Asst. Supt*.... .Norfolk, Neb.
S. A. Teal, *M. M*....... ....Missouri Valley, Ia.
W. H. Ramseyer, *M. C. B*. ..Missouri Valley, Ia.
Smyrna & Delaware Bay R. R. (*See Kent County.*
Sodus Bay Ry. (*See Northern Central.*
Somerset R. R. 4-8½ g. 25 m. 3 lo. 24 cars.
W. M. Ayer, *Supt & Pur. Agt*......Oakland, Me.
S. P. Mosher, *For. Car Rep*.... .Oakland, Me.
C. Crowell, *For. Lo. Rep's*. ...No. Anson, Me.
Sonora Ry. (*See A., T. & S. Fe.*)
Sonoma Valley:
Arthur Hughes, *Gen. Man*. San Francisco, Cal.
H. C. Whiting, *Supt* ....San Rafael, Cal.
J. T. Peters, *Asst. Supt*.........Glen Ellen, Cal.
Ed Reynolds, *M. M*... ....Donahue, Cal
South & North Alabama R. R. (*See Louis. & Nash.*)
South Carolina Ry. 5 g. 246 m. 46 lo. 834 cars.
John B. Peck, *Gen. Man*. ......Charleston, S. C.
S. B. Pickens, *Pur. Agt*........Charleston, S. C.
P. J. Cochrane, *Mast. of Mach*. Charleston, S. C.
Geo. H. Gramling, *M. C. B*....Charleston, S. C
South-Eastern Ry. 4-8½ g. 280 m. 30 lo. 1,000 cars.
T. A. McKinnon, *Gen. Man*.....Montreal, Can.
Robt. McLoud, *M. M*...........Farnham, P. Q.

South Florida R. R. 3 gauge 115 m. 13 lo. 250 cars.
B. R. Swoope, *Supt. & P. A*.......Sanford, Fla.
R. Derby, *M. M*............ ......Sanford, Fla.
A. D. Stentiford, *M. C. B*.........Sanford, Fla.
South Mountain R. R. 4–8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt*. Pine G've Furnace.Pa.
South Pacific Coast R. R. 3 g. 81 m. 16 lo. 500 cars
L. Fillmore, *Gen Supt*. ....San Francisco, Cal.
W. H. Masterman, *M. M. & C. B*..Newark. Cal.
South-Western R. R. (Ga.) (*See Central of Ga.*)
South-Western Ry. (Ky.) 4–8½ g. 5 m. 1 lo. 28 cars
M. Tabler, *Supt. & Man*......Harrodsburg, Ky.
J. C. Hool, *Pur. Agt*..........Harrodsburg, Ky.
Southern Central R. R. 4–8½ g. 156 m. 21 lo. 467 c.
H. D. Titus, *Gen. Supt. & P.A*....Auburn.N.Y
John White, *M. M*... ....Auburn, N. Y.
H. Mooney, *M. C. B*............Auburn, N. Y.
Southern Kansas Ry. (*See At., Top. & Santa Fe.*)
Southern Maryland R. R. 4–8½ g. 20 m. 1 lo. 20 c.
J. B. Ridgway, *Supt*.........Brandywine, Md.
C. R. Joyce, *M. M*......... ...Brandywine, Md
Southern Pacific R. R. 4–8½ g. 203 m. 335 lo. 780 c
Northern Div. (*For other Divs. see Cen. Pac.*)
A. C. Bassett, *Supt*......San Francisco, Cal.
J. R. Watson, *Pur. Agt*....Sacramento, Cal.
J. T. Wilson, *M. M*..... ..San Francisco, Cal.
F. N. Bellisle, *M. C. B*. ...San Francisco, Cal.
Southern Pacific R. R. of Arizona. (*See Cen. Pac.*)
Southern Pacific R. R. of New Mexico. (*See Cen. Pac.*)
Spartanburg, Union & Columbia R. R.
(*See Rich. & Dan.; (3) Div.*)
Spring Brook R. R. 4-3 g. 8 m. 1 lo. 18 cars.
Charles Pugh, *Pres*...... . ... ..Pittston, Pa.
Spring Hill & Parrsboro Ry. (*See Cumberland.*)
Springfield, Effingham & So.-E'n Ry. (*See Ind. & Ill.*)
Springville & Sardinia Ry. 4-8½ g. 12 m. 1 lo. 8 c.
Bertrand Chaffee, *Pres*......Springville, N. Y.
St. Croix & Penobscot R. R. 4–8½ g. 22 m. 4 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt*. .Calais, Me.
G. H. Corsen, *M. M*.... .. ..Milltown, Me
H. C. Tincker, *M. C. B*...........Milltown, Me.
St. Helen, Houghton Lake & West.R.R.4–8½ g. 13 m.
Z. C. Jessop, *Gen. Man*..... ...Detroit, Mich
St. John & Maine Ry. (*See New Brunswick.*)
St. John's Ry. 4–8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin. *Pr. & Supt*. .Jacksonville, F'a.
J. M. Owens, *M. of Mach*....St. Augustine, Fla.
St. John's & Lake Eustis Ry. (*See Florida Southern.*)
St.Johnsb'ry&Lake Champ.4–8½ g.120 m 15 lo.372 c.
A. B. Jewett, *Supt. & P. A*..St. Johnsbury, Vt
Geo. E. Howe, *M. M. & C. B*.St. Johnsbury, Vt
St. Joseph Valley R. R. 3 g. 15 m. 1 lo. 11 cars
E. T. Chase, *Gen. Man*...Berrien Springs,Mich
St. Joseph & Des Loge Ry. 3 g. 13 m. 4 lo. 70 cars.
T. T. Onderdonk, *Supt*......Bonne Terre, Mo
E. B. Keyes, *M. C. B*.........Bonne Terre, Mo
St. Joseph & Western R. R.
4 8½ g. 252m. 21 lo. 175 cars.
L. D. Tuthill, *Gen. Supt.& P. A*.St. Joseph,Mo.
E. Sleepy, *M. M. & . C. B* ...St. Joseph, Mo.
St. Joseph & Des Moines R R. (*See K. C., St. J. & C. B.*)
St. Lawrence & Ottawa Ry. (*See Can. Pac.*)
St. Louis, Alton & Terre Haute R. R.
Main Line. (*See C., C., C. & I.; Ind. & St. L. Div.*
St. Louis & Cairo Div.: 4–8½ g 137 m. 19 lo. 800 c
G. W. Parker, *Gen. Man* ....E. St. Louis, Ill.
J. L. Hinckley. *Supt*... ... .Belleville, Ill
R. M. Pringle, *M. M*..........E. St. Louis. Ill.
St. Louis Bridge Co. and Tunnel R. R.
4–8½ g. 31 m. 22 lo. 11 cars.
Wm. Taussig, *Gen. Man*..........St. Louis, Mo
A. W. Dickinson, *Supt*.... ....St. Louis, Mo.
J. E. Williams. Jr., *Pur. Agt*....St. Louis. Mo
Geo. W. Walshe, *M. M*............St. Louis, Mo
St. Louis, C. Cœur & St. Ch. Ry. 3 g. 16 m.
F. M. Colburn, *Gen. Man*... ...St. Louis. Mo.
St. Louis Coal R. R. 4–8½ g. 93 m. 10 lo. 217 cars.
Robt. Meek. *Supt*..............Carbondale, Ill.
Jas. C. Bryden. *Pur. Agt*... ....St. Louis, Mo.
St. Louis, Des Moines & Northern Ry. 4-8½ g. 43 m.
C. F. Merk, *Supt*....... ....Des Moines. Ia.
St. L., Ft.Scott & Wichita R.R. 4–8½ g.214 m.61.337 c.
J. W. Miller, *V.P.& Gen. Man*..Fort Scott,Kan.
Tho. N. Lewis, *Asst. Supt*......Fort Scott. Kan.
Henry Berger, *M. M* ....Ft. Scott, Kan.
St. L., Hannibal & Keokuk. 4–8½ g. 85 m. 5 lo. 70 c.
E. C. Case, *Rec. & Man*........ Hannibal, Mo.
E. W. Hoisington, *M. M*.........Hannibal, Mo.
St. Louis, Iron Mt. & So'n Ry. (*See Mo. Pac.; (4) Div.*)
St. L., Keokuk & No.-W'n. Ry. (*See C., B. & Q.*)
St. L., Salem & Little Rock. 4–9 g. 72 m. 5 lo. 111 c.
H. A. Crawford, *V. Pr. & P. A*...St. Louis, Mo.
E. B. Sankey, *Supt*........ ....Salem, Mo.
Thomas Everson, *M. M*. ....Steelville, Mo
J. W. Houston, *M. C. B*...........Steelville, Mo.
St. Louis & Cairo R. R. 3 g. 152 m. 22 lo. 896 cars.
Chas.Hamilton. *Gen. Supt*..... .St. Louis. Mo.
T. W. Newell, *M. M*...........E. St. Louis, Mo.
St. L. & San Fran. Ry. 4–8½ g. 943 m. 103 lo. 3,737 c.
C. W. Rogers, *V. P. & Gen. Man*..St. Louis. Mo.
D. H. Nichols, *Supt. Tran*..No. Springfield, Mo.
A. P. Mann, Jr., *Pur. Agt*........St. Louis, Mo.
M. Kearney, *M. M. & C. B*..No. Springfield, Mo.
East Div.: A. Veech, *Supt*...... ...St. Louis, Mo.
Central Div.: W.A.Thoms,*Supt*..Springfield, Mo.
Kan. Div.: J. R. Wentworth, *Supt*.Neodesha,Kan.
St. Martin's & Upham Ry. 4–8½ g. 30 m. 2 lo. 8 cars.
A. E. Killam, *Manager*........St. Martin's, N. B.
St. Paul Eastern Grand Trunk Ry. 4–8½ g. 15 m.
D. C. Lamb, *Gen. Supt*..... ......Oconto, Wis.
St. Paul, Minneapolis & Manitoba Ry.
4–8½ g. 1,402 m. 201 lo. 5,068 cars.
A. Manvel, *Gen. Man*...........St. Paul, Minn.
H. C. Ives, *Asst. Gen. Man*.. .. St. Paul, Minn.
E. B. Wakeman, *Asst.Gen.Supt*.St. Paul, Minn.
J. C. Morrison. *Pur. Agt*........St. Paul, Minn.
Thos. Downing. *M. M. & C. B*..St. Paul, Minn.
Breck. Div.: W. S. Kemp, *Supt*...St. Paul, Minn.
F. F. Div.: J. B. Rice, *Supt*........St. Paul, Minn.
No'n Div.: A. Guthrie. *Supt*.....Crookston, Minn.
St. Paul & Duluth R.R. 4–8½ g. 225 m. 37 lo. 1,080 c.
W. H. Fisher, *Gen. Supt* .... ..St. Paul, Minn.
J. G. Callahan, *Pur. Agt*........St. Paul, Minn.
Chas. F. Ward, *M. M. & M. C. B*..St. Paul, Minn.
State Line & Sullivan R. R. 8½ g. 25 m. 3 lo. 263 c.
I. O. Blight, *Supt*..... ....Towanda, Pa.
Staten Island R. R. ½ g. 13 m. 4 lo. 18 c
J. W. Wilbur, *Supt*.... ....New York, N. Y
Stony Clove & Catskill Mountain R. R.
3 g. 14 m. 2 lo. 22 cars.
Geo. Coykendall, *Gen. Supt*....Rondout, N. Y.
Stony Creek R. R. 4-8½ g. 103 m.
Geo. B. Boggs, *Supt* .... Norristown, Pa.
Sterling Mountain Ry. 6 g. 8 m. 2 lo, 145 cars.
J. C. Missimer, *Supt*..........Sloatsburg, N. Y.
Suffolk Lumber R. R. 3 g. 15 m. 3 lo. 41 cars.
W. M. Whaley, *Supt*., ...Suffolk, Va.
Summit Branch R. R. 4-9 g. 20 m. 7 lo. 10 cars.
Thomas Gucker, *Supt* ....Williamsport, Pa.
Susquehanna & Delaware River R. R. In progress.
D. Y. Kilgore, *Pres*...........Philadelphia, Pa.
Sussex R. R. (*See Del., Lack. & West.*)
Syracuse, Binghamton & N. Y. R. R. (*See D. L. & W.*)
Syr., Ontario & N. Y. R. R.
Albert Allen, *Supt*.............New York, N. Y
Syracuse, Geneva & Corning; Corning, Cowanasque & Antrim R. Rs. 4–8½ g. 142 m. 28 lo. 1,044 c.
A. H. Gorton. *Supt*....... ......Corning, N. Y.
W. E. Gorton, *Asst. Supt*.........Corning, N. Y.
W. H. Chaphe, *Pur. Agt*.. .....Corning, N. Y.
O. C. Patchell, *M. M*............Corning, N. Y.
C. J. Butler, *M. C. B*............Corning N. Y.

T

Tennessee Coal R. R. 5 g. 28 m. 8 lo. 204 cars.
A. M. Shook, *Gen. Man*......Tracy City, Tenn.
W. A. Knight, *M. M*......... Tracy City, Tenn.
Tennessee & Sequatchee Valley R. R.
3 g. 42 m. 1 lo. 24 cars.
Chas. Clinton, *Gen. Supt*....Spring City, Tenn.
P. V. Mooney, *Pur. Agt*......Spring City, Tenn.
Terre Haute & Indianapolis R. R.
4–9 g. 421 m. 105 lo. 4,318 cars.
Joseph Hill, *Gen. Supt*.... ....St. Louis, Mo.
C. R. Peddle, *P. Agt*.......Terre Haute, Ind.
Geo. H. Prescott, *S. M. P. & M*.Terre Haute,Ind.
F. C. Cleaver, *M. M* ....Terre Haute, Ind
E. D. Carter, *M. C. B* ......Terre Haute, Ind.
Chas. Butler, *M. M*..... ....Effingham, Ill.
Clinton Idler, *Foreman* ... Indianapolis, Ind)

Terre Haute & So.-Eastern Ry. 4–9 g. 44 m. 2 lo. 145 c.
Geo. Atherton, *Supt*......... Terre Haute. Ind.
Texas-Mexican Ry. (*See Mex. Nat*..
Texas Trunk R. R. 4–8½ g. 36 m. 2 lo. 8 cars.
Hugh Irwin, *Gen. Supt*.......... ..Dallas, Tex.
Texas Western Ry. 3 g. 52 m, 2 lo. 44 cars.
Henry Hatch, *Gen. Man*....... ....Houston, Tex.
T. F. Glispin, *M. M*...............Houston, Tex.
Texas & N.O.R. R. (*See Cen. Pac.; G. H. & S. A. Div.*)
Texas & Pacific. (*See Mo. Pac. Ry.; (6) Div.*)
Texas & St. Louis Ry. 3 g. 769 m. 84 lo. 2,000 cars.
W.R.Woodard, *Rec.and Gen.Man*.St.Louis, Mo.
J. J. Frey, *Gen. Supt*........ ...Pine Bluff, Ark.
C. S. Brooke, *Pur. Agt*........... St. Louis. Mo.
M. B. Jones, *M. C. B*...........Pine Bluff, Ark.
Mo. & Ark. Div.:
W. H. Adams, *Supt*..........Pine Bluff, Ark.
Rich. Williams, *M. M*....... Pine Bluff, Ark.
Tex. Div.: H. Flanders, *Supt*.. ... Tyler, Tex.
P. J. Milan, *Gen. M. M*..........Pine Bluff, Ark.
onesta Valley R. R. 3 g. 15 m.
George Dickinson, *Gen. Supt* .... Sheffield, Pa.
Tioga R R 4–8½ and 6 g. 67 m. 18 lo. 960 cars
L. H. Shattuck, *Supt*............Blossburg, Pa.
J. C. Guthrie. *Pur. Agt*.. ...New York, N. Y.
Pere Bonny, *M. M*...............Blossburg, Pa.
D. H. Stratton, *M. C. B*... .. .Blossburg, Pa.
Toledo, Ann Ar. & No. Mich. Ry.
4–8½ g. 63 m. 9 lo. 186 c.
J. M. Ashley, *Gen. Man*......Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt*. do
C. C. Dodge, *M. M*............Ann Arbor, Mich.
Toledo. Cin. & St. Louis R.R. 3 g. 798 m. 101 lo. 3,500 c.
E. P. Murray, *Gen. Supt*.... ....Toledo, O.
F. W. Stewart, *P. Agt*................Toledo, O.
Thos. Robertson, *M. M*.... .... .Delphos, O.
Toledo Div.: W. H. Vandergrift, *Supt*.; do
J. S. Wiers. *For. Car Rep*........Delphos, O.
St. Louis Div.: Frank F. Allen....Charleston. Ill.
P. H. Murphy. *M. M* .. ..Charleston. Ill.
Toledo & Indianapolis R. R. 4-8½ g. 43 m. 4 lo. 118 c.
David Robison, Jr., *Rec* . ...Toledo, O.
Tonawanda Val. & Cuba R. R. (*See Brad., B. & K.*)
Toronto. Grey & Bruce Ry. (*See Canadian Pacific.*)
Toronto & Nipissing Ry. (*See Mid. Ry. of Can.*)
Troy & Boston R. R. 4–8½ g. 48 m. 20 lo. 484 cars.
D. Robinson. *Pres*.... ....Troy, N. Y.
Joseph Crandell, *Supt*. .... Troy, N. Y.
C. H. Hubbell, *Pur. Agt*........ ....Troy, N. Y.
Z. B. Davis, *M. M* ....Troy, N. Y.
A. Brewer, *M. C. B*................Troy, N. Y.
Troy & Greenfield R. R. & H. Tunnel. 4–8½ g. 44 m.
A W. Locke, *Man*.........North Adams, Mass.
Tuckerton R. R. 4–9 g. 31 m. 2 lo. 29 cars
J. J. Pharo, *Supt.& Pur. Agt*.Tuckerton, N. J.

U

Ulster & Delaware R. R. 4–8½ g. 74 m. 10 lo. 218 cars.
Jas. H. Jones, *Supt*.... ....Rondout, N. Y.
John H. Decker, *M. C. B*........Rondout. N. Y.
Union Ry. 5 g. 9 m. 3 lo.
C. E. James, *Pres*....... . Chattanooga, Tenn.
D. J. O'Connell, *Gen. Man*.Chattanooga, Tenn.
Union Pacific Ry. (7 Gen. Divs.)
3 & 4–8½ g. 4,633 m 510 lo. 10,550 cars.
S. R. Callaway, *Gen. Man*....... ..Omaha, Neb.
S. T. Smith. *Gen. Supt* ....Omaha, Neb.
Thos. L. Kimball. *Asst. Gen Man*.Omaha, Neb.
Pur. Agt............Omaha, Neb.
I. H. Congdon, *S. M. P. & C. D*...Omaha, Neb.
John Wilson, *Asst. do*............Omaha, Neb.
(1) Neb. Div.: O.H. Dorrance, *Gen.Supt*.Omaha,Neb.
E. Div.: C. B. Havens, *Supt* . ....Omaha, Neb.
M. M........... Omaha, Neb.
A. M. Collett, *M. C. B*..........Omaha, Neb.
L. Pole Div.: W. A. Deuel, *Supt*..Cheyenne, W.T
J. H. McConnell. *M. M*. ....N. Platte. Neb.
(2) Wy. Div.: E. Dickenson, *Gen.Supt*..Laramie, W. T.
T. A. Davis, *M. M*........... Laramie, W. T.
Wes. Div.: C. E. Wurtelle, *Supt*. Evanston, W. T.
Geo. F. Chapman, *M. M*......Evanston, W. T
(3) Idaho Div.: R. Blickenderfer, *Gen. Supt*.Ogden,U.
John S. Hickey, *M. M*.........Shoshone, Id.
Ogden Short Line Div.:
R. Blickensderfer, *Supt*.... .. Pocatello, Id.
Utah & Northern Div.:
J. S. Hickey, *M. M*.........Eagle Rock, Id.
J. W. Paul. *Gen. For. C. D*.. .Eagle Rock, Id
(4) Col.Cent. Div.: A.A.Egbert, *Gen.Supt*.Denver, Col.
F. Meirtsheimer, *M. M*. ....Denver, Col.
C. C. Div.: P. Touhy, *Supt*.........Denver, Col.
So. Park Div.: J. T. Choate, *A. Supt*..Como, Col.
(5) Kan. Div.: H.O.Brinkerhoff, *G. Supt*.Kan. City,Mo.
K. Pac. Div.: J. O.Brinkerhoff, *Supt*.Kan.C'y,Mo.
J. O. Chapman, *M. M*. .... Armstrong. Kan.
T. B. Roberts. *M. C. B*......Armstrong. Kan.
Kansas Central Div.:
J. O. Brinkerhoff, *Supt*..Leavenworth, Kan.
Smoky Hill Div.:
O. H. Dorance, *Supt*...........Wallace, Kan.
J. B. Dailey. *M. M*. ....Ellis. Kan.
(6) Salt Lake & Western Div.:
W. W. Ritter, *Supt*.... ..Salt Lake City Utah.
United States Rolling Stock Co. 19 lo. 4,692 cars.
A. Hegewisch, *Pres*............New York, N. Y.
W. H. Chaddock, *Gen. Agt*........Chicago, Ill.
Utah Central Ry. 4–8½ g. 280 m. 21 lo. 358 cars.
John Sharp, *Gen. Supt*.. Salt Lake City, Utah.
S. H. Hill, *Pur. Agt*.... Salt Lake City, Utah.
Geo. G. Bywater, *M. M*..Salt Lake City, Utah
Peter Reid, *M. C. B*.......Salt Lake City, Utah.
Utah & Nevada Ry. 3 g. 37 m. 3 lo. 33 cars
W. W. Ritter, *Gen. Man*...Salt Lake City, Utah.
Robert Anderson, *M. M*..Salt Lake City, Utah.
Utah & Northern Ry. (*See Union Pac.; (3) Div.*)
Utah & Pleasant Valley Ry. (*See Den. & Rio. Gr.*)
Utica, & Black Riv. R. R. 4–8½ g. 180 m. 25 lo. 412 c.
E. A. Van Horne, *Gen.Supt. & P.A*..Utica,N.Y.
H. W. Hammond, *Asst. Supt*.......Utica, N. Y.
John Bailey, *M. M*........ ....Utica, N. Y.
David James. *M. C. B*... ....Utica. N. Y.

V

Vaca Vall. & Clear Lake R. R 4–8½ g. 30 m. 2 lo. 19 c.
G. B. Stevenson. *Gen. Supt*... .Vacaville, Cal
Valley Ry. (Ohio) 4–8¾ g. 75 m. 20 lo. 889 cars.
Isaac Reynolds, *Gen. Man*.... . .Cleveland, O
H. Melcher, *Pur. Agt*.............Cleveland. O.
C. T. Johns, *M. M*............... Cleveland, O.
Valley R. R. Va. 4 8½ g. 62 m
S. Spencer, *Pres* ....Baltimore, Md.
Vicksburg & Brunswick R. R. (*See Cen. of Ga.*)
Vicksburg & Meridian R.R. (*See Cin., N.O.& Tex.Pac.*)
Vicks.Shreveport & Pac. R. R. (*See C., N. O. & T. P.*)
Victoria Ry. (*See Midland Ry. of Can.*)
Virginia Midland Ry. (*See Rich. & Dan.; (4) Div.*)
Virginia & Truckee R. R. 4–8½ g. 52 m. 14 lo. 322 c.
Carson & Colorado R. R. 3 g. 294 m. 8 lo. 228 c
H. M. Yerington, *Gen. Supt*... .. Carson. Nev.
R. J. Laws. *A.Supt*.(C. & Col.)Hawthorne, Nev.
Hume Yerington, *Pur. Agt*........Carson, Nev.
I. N. Fording, *M. M*. ....Carson, Nev.
M. M. Hyde. *M. C. B*.......... Carson. Nev.

W

Wabash, Chester & W'n R. R. (*See St. Louis Coal.*
Wabash, St. Louis & Pacific Ry. (4 Gen. Divs.)
4–8½ g. 3,241 m. 598 lo. 17,230 cars.
Jas. F. Joy. *Pres* ....St. Louis, Mo.
A. L. Hopkins, *V. P*........... St. Louis. Mo.
A. A. Talmage, *Gen. Man*... ...St. Louis, Mo.
H. H. Wellman, *Pur. Agt*.......St. Louis. Mo.
J. B. Barnes, *Supt.M. P.& M*..Springfield, Ill.
M. M. Martin, *Supt. Car Dept*. ... Decatur, Ill.
(1) Eas'n Div.: G. W. Stevens, *Supt*.......Peru, Ind.
O. J. Wilson, *M. M* ....Fort Wayne, Ind.
A. W. Quackenbush, *Asst. M. M*.. Peru, Ind
Thos. Anderson, *M. C. B*..........Peru, Ind.
Cairo Div.: C. F. Lape, *M. M*...Mt. Carmel. Ill.
(2) Middle Div.: E. N. Armstrong, *Supt*. Decatur, Ill.
Henry Seips, *M. M*........... Springfield. Ill.
B. B. Rose, *M. C. B*...............Decatur, Ill.
G. A. Hurd, *Asst. Supt*. ....Decatur, Ill.
E. B. Hyde, *Asst. Supt* .... Havana, Ill.
(3) Western Div.: R. G. Butler, *Supt*....Moberly, Mo
W. J. Brokaw, *M. M*...............Moberly, Mo.
John Lang, *M. C. B*...............Moberly, Mo.
D. Moin. Div.: C. F. Meek, *A. Supt*.Des Moines, Ia
Walden's Bridge R. R. 3 g. 23 m. 3 lo. 37 cars.
John G. Scott, *Gen Man*....Jenks P. O., Tenn.

Wallkill Valley.
J. E. Childs, *Gen. Supt*........New York, N. Y.
Geo. H. Graves, *Supt*.... ......Kingston, N. Y
E. Minshull, *M. M*........ ...Middletown, N. Y.
I. W. Fowler, *Pur. Agt*.... .Middletown, N. Y.
Walla Walla & Columbia Riv. R. R. (*See Ore. Ry.*)
Walton R. R. 5 g. 10 m. 1 lo. 7 cars.
D. H. Walker, *Pres*................Monroe, Ga.
Warren & Farnsworth Valley R. R.
3 g. 16 m. 3 lo. 39 cars.
A. D. Wood, *Gen. Man*.... .....Warren, Pa.
Warwick Valley R. R. (*See Leh. & Hud. River*)
Washington,Ohio & West.R.R.4–8½ g.52 m.5 lo.87 c.
S. M. Brophy, *Supt* .... Alexandria Va.
W. Mountjoy. *Act. For*....... .Alexandria, Va.
John Harrison. *M. C. B*........Alexandria, Va
Waynesburg & Washington Rd. 3 g. 29 m. 3 lo. 26 c
C. E. Bower, *Supt*.............Waynesburg, Pa
A. M. Kline, *M. C. B*.... .....Waynesburg, Pa
Welland Ry. 4–8½ g. 25 m. 4 lo. 147 cars
William Pay, *Supt*. ....St. Catharines, Ont
Jas. Taylor. *M. M*... ......St. Catharines, Ont
Wm. H. Pay, *M. C. B*.....St. Catharines, Ont
West Feliciana R. R. 4–8½ g. 27 m. 2 lo. 22 cars
J. B. McGehee, *Pr. & Gen. Supt*.Bayou Sara, La
J. A. Tilton, *M. M. & C. B*.....Bayou Sara, La
W. Va., Central & Pittsb'g Ry.4-8½ g.50 m.4 lo.119 c
T. B. Davis, *Gen. Man*.......Piedmont, W. Va
W. E. Porter. *Gen. Supt*......Piedmont. W. Va
Geo. W. Harrison, *Pur. Agt*...Piedmont, W.Va
E. W. Lippencott, *M. M*.....Piedmont, W. Va.
West & East R. R. (*See Ill. Cen.; N. O. Div.*)
West Jersey R. R. (*See Penn. R. R.; (3) Div.*)
Western R. R. (of Ala.) 5 g. 85 m. 15 lo. 270 cars.
Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 240 c.
Cecil Gabbett, *Gen. Man. & Supt*...Mont., Ala.
C. D. Wall, *M. M. & C. B* ...Montgomery, Ala
Western Counties' Ry. 4–8½ g. 67 m. 8 lo. 137 cars.
J. Brignell, *Supt*. ....Yarmouth. N. S.
Western Maryland R. R. 4–8½ g. 127 m. 28 lo. 610 c.
J. M. Hood, *Pr. & Gen. Man*....Baltimore, Md.
R. J. Adair, *Pur. Agt*........... Baltimore, Md.
David Holtz, *Mast. of Mach*..Union Bridge, Md.
J. H. Nussear, *M. C. B*.. ....Union Bridge, Md.
Western No. Carolina R. R. 5 g. 210 m. 17 lo. 160 c.
V. E. McBee, *Supt*...............Salisbury, N. C.
Jos. P. Minetree. *Pur. Agt*.......Richmond, Va.
G. W. Gates, *M. M*.... ....Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 58 lo. 952 c.
R. A. Anderson, *Gen. Supt*.........Atlanta, Ga.
A. B. Bostwick. *Asst. Supt*..... Atlanta, Ga.
Lamar Collier, *M. M* ....Atlanta, Ga
Wm. Kinyon, *M. C. B*. .. ..Atlanta, Ga,
Wheeling, Pittsburg & Baltimore R. R. (*See B. & O.*)
Wheeling & Lake Erie R. R. 267 m. 37 lo. 1.922c.
M. D. Woodford, *Rec. & Gen. Man*..Toledo, O.
O. P. Dunbar, *Gen. M. M*..........Norwalk. O.
John Hillhouse. *Div. M. M*........Norwalk, O.
Cleve. & Mar. Div.: P. Pease, *Rec. & Gen. Man.*
A. Galloway, *M. M*. ....Cambridge, O.
Whitby, Port Perry & Lindsay Ry. (*See Mid. of Can.*)
White Water R. R. (*See Ft. W., Cin. & Lou.*)
Whitefield & Jefferson R. R. (*See Bos., Con. & Mon.*)
Whitneyville & Machiasport R. R. 8 m. 2 lo. 48 c.
C. Sullivan, *G.M. & Pur.Agt*.Whitneyville, Me.
Wicomico & Pocomoke R. R. 4-8½ g. 30 m. 2 lo. 38 c.
L. Showell, *Pres*............... ....Berlin, Md.
Williamsport & North Branch R. R.
4–8½ g. 14 m. 2 lo. 4 cars.
B. G. Welch, *Man. & P. Agt*...Hughesville, Pa.
Williamstown & Del. River R. R.
4-8½ g. 27 m. 1 lo. 12 cars.
Samuel Garwood, *Supt* ...Williamstown, N. J
Wilmington, Columbia & Augusta R. R. (*See W. & W.*)
Wilmington & No'n R. R. 4–8¾ g. 85 m. 17 lo. 155 c.
A. G. McCausland, *Supt.& P. A*.Wilmington,Del
George Rommel, *M. M*........Wilmington, Del.
Alex. Maitland, *M. C. B*...... Wilmington. Del.
Wilmington & Weldon; Northeastern; S. C. Central; Cheraw & Darlington; Cheraw & Salisbury; and Wilmington, Columbia & Augusta R. Rs.
4-8½ g. 682 miles 104 locomotives 1,725 cars.
H Walters, *Gen. Man*......... Baltimore, Md.
J F. Divine, *Gen. Supt*.......Wilmington, N. C.
John Bisset, *M. M*...........Wilmington, N. C.
W. H. Day, *M. C. B*.............Florence, S. C.
J. H. Davis, *M.C.B*. (W.& W.). Wilmington, N. C.
Winifrede R. R. 4–9 g. 5 m. 1 lo. 65 cars.
Theodore Wright, *Pres*........Philadelphia, Pa.
Windsor & Annapolis Ry. 4–8½ g. 130 m. 10 lo. 160 c.
P. Innes, *Gen. Man*.............Kentville, N. S.
Wm. Yould, *M. M*..............Kentville, N. S.
Wm. Grierson, *M. C. B*..........Kentville, N. S.
Wisconsin Central R. R. 4–8½ g. 480 m. 49 lo. 1,800 c
F. N. Finney, *Gen. Man*........Milwaukee, Wis.
E. K. Howes, *Pur. Agt*........Milwaukee, Wis.
H. A. arnes, *M. M*............Stevens Pt., Wis.
Mil. East. Mid. So. & No. Divs.:
A. A. Allen, *Supt*... ....Milwaukee, Wis.
Wis. & Minn. and Minn. St. C. & Wis. R.R.'s.:
G. T. Wiswell, *Supt*......Chippewa Falls, Wis.
Wisconsin, Iowa & Nebraska.
G. C. McMichael, *Supt*.......Marshalltown, Ia.
J. V. Johnston, *Pur. Agt*.....Marshalltown, Ia.
M. C. Wheeler. *M. M*........Marshalltown, Ia.
Wisconsin & Michigan R. R. (*See Mil. & North'n.*)
Wisconsin & Minnesota R. R. (*See Wis. Cen.*)
Woodruff Sleeping & Parlor Coach Co.
Job H. Jackson, *Pres*........Philadelphia, Pa.
Wm. G. Johnston, *V-Pres*....Philadelphia, Pa.
J. C. Paul, *Gen. Man*.........Philadelphia, Pa.
R. A. Rutherford, *Supt*.......Philadelphia, Pa.
Wood River Branch R. R. 4–8½ g. 6 m. 2 lo. 3 cars.
L. M. Barber, *Supt*..........Hope Valley, R. I.
Woodstock R. R. 4-8½ g. 14 m. 1 lo. 3 cars.
J. G. Porter, *Supt*...............Woodstock, Vt.
Worcester, Nashua & Rochester R.R.
4–8½ g. 95 m. 20 lo. 523 cars.
Chas. Howard, *Gen. Man*....Worcester, Mass.
G. W. Hurlburt, *Supt*.........Worcester, Mass.
A. R. Barrett, *M. M. & C. B*..Worcester, Mass
Worcester & Shrewsbury R. R. 3 g. 3 m. 3 lo. 9 c.
J. F. Bigelow, *Supt*.... ....Worcester, Mass.
G. E. Hapgood, *Pur. Agt*....Worcester, Mass.
Chas. Cleveland, *M. M* ....Worcester, Mass.
Worcester & Somerset R. R. (*See N.Y., Phil. & Nor.*)

Y

York & Peach Bottom Ry 3 g. 40 m. 5 lo. 100 c.
S. M. Manifold, *Supt. & Pur. Agt*.....York, Pa.
G. W. Hoover, *M. M*........... ......York, Pa.

WILLIAMSON & CASSEDY.
Railway, Machinists' and Steamship
SUPPLIES OF EVERY DESCRIPTION
24 South Fourth Street,
PHILADELPHIA.

STEEL CASTINGS
RAILROAD and MACHINE
CASTINGS.
½ lb. to 10 Tons.
LOCOMOTIVE CROSS HEADS
AND GEARING A SPECIALTY.
Eureka Cast Steel Company.
307 Walnut St., Philadelphia, Pa.

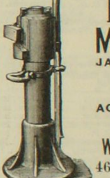
ADJUSTABLE HEADLIGHT
SWITCH & CAR LOCKS
LOCOMOTIVE HEADLIGHTS
POST & COMPANY
MANUFACTURERS & DEALERS IN
RAILWAY SUPPLIES.
AMERICAN STUDENT LAMP
CAR LAMPS
CAR TRIMMINGS
IN LATEST STYLES & FINISH
FANCY LANTERNS ALL STYLES
CINCINNATI OHIO, U.S.A.

THIS HAMMER
AWARDED THE FIRST PREMIUM OF A SILVER MEDAL
AT THE
American Institute Fair,
N. Y. CITY, NOV., 1873.

POWER
"THE PALMER"
SPRING HAMMER

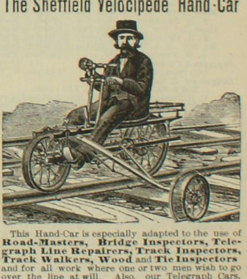
Superior in every point to any modification of the Trip Hammer. Simple, Powerful, Efficient and Cheap. Four sizes now being built. For Prices and Descriptive Circulars, address the manufacturers,
S. C. FORSAITH & CO.,
Manchester, N. H.,
who are also builders of the
Abbe Bolt-Heading Machine

PORTABLE FORGES.
Send for Catalogue to
EMPIRE PORTABLE FORGE CO.,
COHOES, N. Y.



HYDROSTATIC
MACHINERY.
JACKS,
PUNCHES,
PRESSES,
PUMPS,
ACCUMULATORS,
VALVES,
FITTINGS, ETC.
Watson & Stillman,
468 B Grand Street.
NEW YORK.

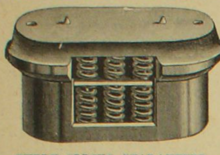
The Sheffield Velocipede Hand-Car



This Hand-Car is especially adapted to the use of **Road-Masters, Bridge Inspectors, Telegraph Line Repairers, Track Inspectors, Track Walkers, Wood** and **Tie Inspectors** and for all work where one or two men wish to go over the line at will. Also, our Telegraph Cars, capable of carrying two men and material. Light, Easily Handled, and when ready for shipment occupy very little space in Baggage Car—a great advantage to railroad men. Run easily, being propelled by the **ROWING MOVEMENT.** Can be run short distances at the rate of **20 Miles an hour; and will not jump the track.**
HENRY W. PEABODY & CO.,
MASON BUILDING, BOSTON.
GENERAL PURCHASING AGENTS
For Foreign Railway and Tramway Companies

W. BAILEY LANG,
Sole Agent in the United States and Canadas for the
LOWMOOR
IRON COMPANY.
Bar Iron of great strength and uniform quality
Plate Iron unequaled for Fire Boxes.
Tyres, Axles, Chain, Rivets, Angle and **T Iron** and **Forgings**
of all descriptions.
STAY-BOLT IRON.
A full assortment of Bar Iron in store.
50 Beekman St., N.Y. 39 Fort Hill Square, Boston

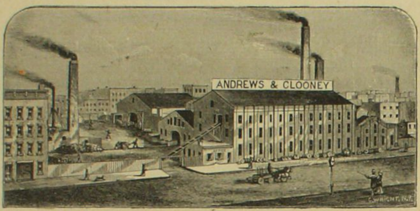
THE
ORIGINAL A. B. DAVIS SPIRAL CAR SPRINGS



EVERY SPRING GUARANTEED.

Manufactured Only
BY THE
A. B. DAVIS CAR SPRING CO.
(Limited)
S. W. Cor. 23d and Hamilton Sts.,
PHILADELPHIA.

ANDREWS & CLOONEY,
GLOBE IRON AND COLUMBIA CAR SPRING WORKS.



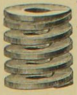
Office, 545 West Thirty-third Street; Works, 535 to 551 West Thirty-third Street and 538 to 552 West Thirty-fourth Street,
NEW YORK.

Manufacturers of Elliptical, Spiral, Volute Car and Engine Springs, Car Wheels, Axles, Pedestals Brake Shoes, Boxes, Brass Bearings and Castings of all descriptions where great strength is required. Also, Sweepers Snow-Plows, Turn-tables, Automatic Switches, Track Work, tc.

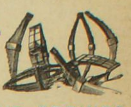
NATHAN H. DAVIS, Prest. LEWIS C. GRATZ, Treas. HENRY AVERY, Jr., Secretary,
DIAMOND STATE CAR SPRING CO.
WORKS: WILMINGTON, DELAWARE.
OFFICES: 411 & 413 WALNUT ST., PHILA.

LICENSED TO MANUFACTURE EDGE-ROLLED SPRINGS OF EVERY VARIETY.

ELLIPTIC, LOCOMOTIVE,



Flat and Round Bar Car Springs.
SPIRAL SPRINGS
OF EVERY DESCRIPTION.
Davis' Patent Bolster Draw,
BUFFER AND EQUALIZING SPRINGS.



IMPROVED BAND FOR LOCOMOTIVE SPRINGS.
VULCAN JOURNAL BEARINGS.

CHAS. W. PICKERING, CHAIRMAN. FRANK S. LAYNG, SEC'Y AND TREAS.
PICKERING SPRING CO. Limited,
MANUFACTURERS OF
RAILWAY AND MACHINERY SPRINGS
BOSTON: H. L. LEACH, Agt. | PHILADELPHIA. | C. R. KEARNS, Southern Agent.

BOUND VOLUMES OF THE NATIONAL CAR-BUILDER
For 1880, 1881, 1882, 1883 and 1884. Price, $3 each.

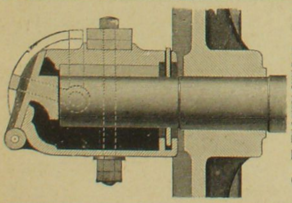
JAMES JEFFRIES & SONS,
MANUFACTURERS OF
ELLIPTIC & HALF ELLIPTIC CAST-STEEL SPRINGS,
For Railroad Cars and Locomotives.
813 JAYNE STREET, PHILADELPHIA, PA.

CHARLES SCOTT.
ELLIPTIC AND SPIRAL SPRINGS FOR RAILWAY CARS AND LOCOMOTIVES.
1028 TO 1038 NEW MARKET STREET. PHILADELPHIA.

CRESCENT STEEL WORKS.
MILLER, METCALF & PARKIN,
PITTSBURGH, PA.

Works: 48th to 51st Streets, Pittsburgh.
Depots: 22 and 24 West Lake Street, Chicago.
" 480 Pearl Street, New York.
" 1,232 Market Street, Philadelphia. } ELY & WILLIAMS.

STEEL OF ALL DESCRIPTIONS and CAR SPRINGS.

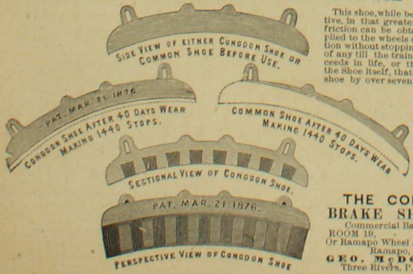


RAOUL JOURNAL BOX.

This box is designed to provide an end stop for the axle, and thereby dispense with the shoulder and collar, and at the same time not obstruct the process of packing the box. The journal may be made any desired length and diameter. The life of the axle is doubled. The expense of brasses and lubricants enormously reduced; end wear of brasses and hot boxes obviated. It is now in successful operation on trucks of engines, tenders, passenger and freight cars. For further information address

RAMAPO WHEEL & FOUNDRY COMPANY
Ramapo, N. Y.;
Columbus Iron Works Company
Columbus, Ga.

CONGDON'S IMPROVED CAR BRAKE SHOE.


SIDE VIEW OF EITHER CONGDON SHOE OR COMMON SHOE BEFORE USE.
PAT. MAR. 21, 1876.
CONGDON SHOE AFTER 40 DAYS WEAR MAKING 1440 STOPS.
COMMON SHOE AFTER 40 DAYS WEAR MAKING 1440 STOPS.
SECTIONAL VIEW OF CONGDON SHOE.
PAT. MAR. 21, 1876.
PERSPECTIVE VIEW OF CONGDON SHOE

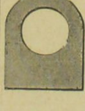
This shoe, while being more effective, in that greater uniformity of friction can be obtained when applied to the wheels of a train in motion without stopping the revolution of any till the train is at rest, exceeds in life, or the durability of the Shoe itself, that of the cast iron shoe by over seventy-five per cent.

Its durability, together with cheapness and simplicity of construction, recommend it in preference to any other in use

All communications should be addressed to

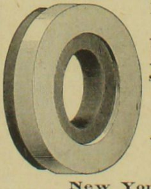
THE CONGDON
BRAKE SHOE CO.,
Commercial Bank Building,
ROOM 19, - - CHICAGO.
Or Ramapo Wheel & Foundry Co.,
Ramapo, N. Y.
GEO. McDOUGALL,
Three Rivers, P. Q., Canada.

VULCANIZED FIBRE CO.,
SOLE MANUFACTURERS OF



HARD AND FLEXIBLE
VULCANIZED FIBRE.
Flexible Vulcanized Fibre Dust Guards
and Oil-Box Covers,
being absolutely unaffected by oil or heat, are far more durable and efficient than Leather, and much cheaper.

THE NEW
"IRON-CLAD" FIBRE TRACK WASHERS.

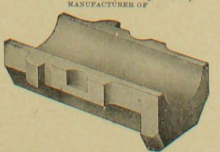


PERFECTED BY TEN YEARS' EXPERIENCE.
Surpassing all other Nut-Lock Devices in
Durability, Effectiveness and Cheapness.
Strengthened and Protected from Weather.
Cannot be Crushed or Burst.
Will not Lose their Elasticity, nor Rot.
Adapted for both Plain and Angle-bars.

VULCANIZED FIBRE CO.
WILMINGTON, DEL.
New York Office, No. 15 Dey Street.

STANDARD RIVET COMPANY,
MANUFACTURERS OF
BOILER, TANK, BRIDGE, BOAT AND GIRDER RIVETS.
STEEL RIVETS A SPECIALTY.
180 COLUMBUS STREET, CLEVELAND, OHIO.

AMERICAN BRONZE WORKS,
J. W. HEISER, Proprietor,
MANUFACTURER OF



BRONZE AND BRASS BEARINGS.
Car and Locomotive Work a Specialty,
23 Columbus Street, Cleveland, Ohio.

FOR SALE.
21 SECOND-HAND LOCOMOTIVES,
VARIOUS SIZES.

28 Passenger Cars now in daily service on two leading Boston roads; also 1 Wheel Press, 1 Wheel Bore.

For prices and specifications address

GEO. F. COCHNOWER & CO., Agts.,
10 Oliver Street,
Boston, Mass.

PARROTT VARNISH COMPANY,
MANUFACTURERS OF FINE
RAILWAY VARNISHES,
BRIDGEPORT, CONN.

UNITED STATES CAR COUPLER.
Recommended by the Master Car-Builders at Saratoga in 1884.
Prescribed by the Massachusetts Board of Railroad Commissioners in 1885.
Total Cost Per Car, including Royalty, $13.

Entire Saving of Pins. Automatic with the Common Draw-bar or any other form presenting the Link. Self-couples with Draw-bars with a variation of six inches in height. No change of Draw-timbers.

COST OF APPLICATION THE SAME AS THE OLD FORM.

Adopted as the standard by the Boston & Lowell, Boston & Maine, Eastern, Maine Central, European & North American, Boston, Concord & Montreal, Northern, Concord, Connecticut and Passumpsic, Ogdensburg & Lake Champlain, and other roads.

UNITED STATES CAR COUPLER CO.,
4 Sears Building, Boston, Mass.
T. W. FAWCETT, Western Agent, - - 225 E. Kinsie St., Chicago, Ill.

ASPHALTUM PAINT IN ALL COLORS FROM 1 GALLON TO A BARREL.

NATIONAL PAINT WORKS
WILLIAMSPORT, PA.
THE ONLY MANUFACTURERS OF
ASPHALTUM PAINTS
Mixed Ready for Use in All Colors.
THE STANDARD FOR QUALITY.

Asphaltum, when properly combined, is a most valuable material for outdoor paints.

It has been adopted and used by the most prudently managed Railway Companies, Car and Bridge Builders in the United States.

In the preparation of our paint we use only the best Lead, Zinc, Minerals and Crude Asphaltum, *ground in and thinned with pure Linseed Oil.*

Our paints are unsurpassed for Depots, Freight Cars, Bridges (Wood or Iron), Tin and Iron Roofs, Houses, Barns, etc.

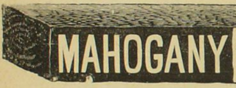
Samples, Price Lists and references from those who have used and are now using these paints, furnished on application.

POILLON & STAPLES,
MANUFACTURERS OF
COACH and CAR VARNISHES.
Works and Office: East 148th St., cor. Fourth Avenue, New York.

THE PATENT SHAFT AND AXLETREE CO.
(LIMITED),
OF WEDNESBURY, ENGLAND,
MANUFACTURERS OF
Wrought-Iron Steel Tyred Engine and Car Wheels, Iron and Steel Axles, Locomotive and Car Wheel Tyres, Etc., Etc.
Represented in the United States by
W. R. ELLIS.
NEW YORK: No. 18 BROADWAY, Room 620.
BOSTON: No. 139 MILK STREET.

ROCHESTER CAR WHEEL WORKS.
OFFICE AND WORKS:
No. 8 BROWN'S RACE STREET, ROCHESTER, N. Y.
MANUFACTURERS OF
RAILROAD CAR WHEELS
Of Best Quality.
WM. H. BARNUM, Pres't. WM. K. CHAPIN, Vice-Pres't. CHAS. T. CHAPIN, Sec. and Treas.
WE WILL ONLY MAKE A FIRST-CLASS WHEEL.

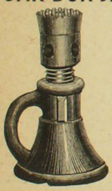
WM. E. UPTEGROVE & BRO.



All Veneers and Cabinet Woods.
FRENCH BURL VENEERS
A Specialty.
SAW MILLS AND OFFICE Foot 10th & 11th Streets, East River NEW YORK.

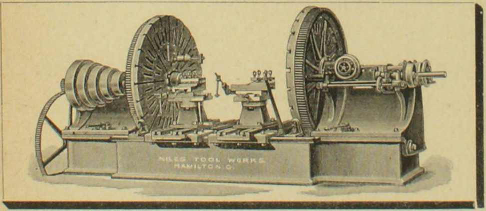
GRIFFIN CAR WHEEL CO.,
DETROIT, MICH.
GRIFFIN & WELLS FOUNDRY CO.,
CHICAGO, ILL.
THOMAS F. GRIFFIN & SONS,
BUFFALO, N. Y.,
MANUFACTURERS OF
RAILROAD CAR WHEELS AND CASTINGS.
Annual Capacity, 250,000 Wheels. 15,000 Tons Castings

CAR BOX JACK SCREW,

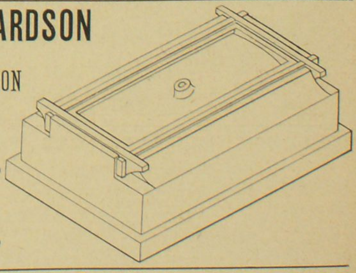


With Ball-Jointed Top, which adapts itself perfectly to the bottom of the Axle-Box.
Total height, 12 in. Will lift 4½ in. Screw 2¼ in. diam.
BEST AND CHEAPEST JACK IN THE MARKET.
PRICE $4.50.
Liberal Discount to Railroad Companies.
Also, Superior Railroad and Machinery Castings.
Springfield Foundry Co.,
No. 105 Liberty Street,
Springfield, Mass.

Fine Coach and Railway Varnishes.
CLARENCE BROOKS & CO.
MANUFACTURERS OF
VARNISHES,
Cor. West and West 12th Streets,
NEW YORK.
SEND FOR PRICE LIST.



THE RICHARDSON
AND THE
ALLEN-RICHARDSON
BALANCE
Slide-Valves.



MANUFACTURED BY
F. W RICHARDSON,
TROY, N. Y.

OCEANIC Steam Laundry COMPANY.
RAILROAD,
STEAMSHIP, HOTEL AND
RESTAURANT WORK.
630 GRAND AND 32 to 38 BISHOP STREETS,
CHAS. ZUST, Manager. JERSEY CITY, N. J. TELEPHONE CALL 214.

DRAWING INSTRUMENTS
AND MATERIALS OF ALL KINDS.
CATALOGUES ON APPLICATION.
Successor to W. Y. McALLISTER.
OSWALD McALLISTER,
1226 CHESTNUT STREET,
Philadelphia, Pa.